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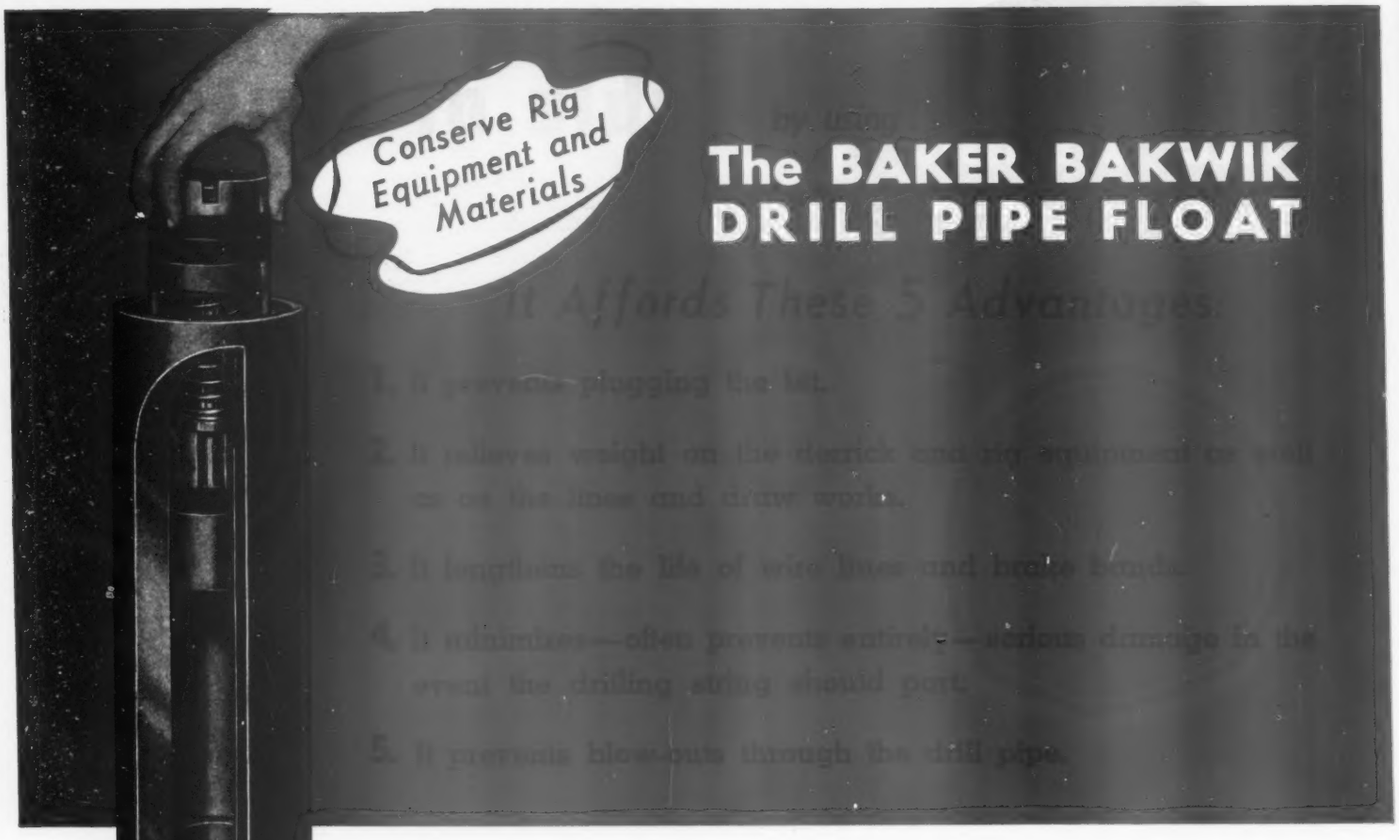


The BAKER BAKWIK DRILL PIPE FLOAT

NO TOOLS OR SPECIAL WRENCHES ARE REQUIRED

The Baker Bakwik Model "B" Drill Pipe Float is made with a straight bore body and contains a simple Valve Assembly constructed entirely without threads, which is dropped into place by hand and held securely by the tool joint pin above it. When an unrestricted fluid passage is desired, the Valve assembly can be quickly and easily removed from the Float Body.

POSITIVE ACTING BACK-PRESSURE VALVE

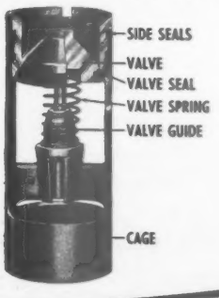
At the slightest reversal of pressure, the Valve, with its recessed oil resistant Seal, instantly seats against the Valve Seat, creating a positive, leakproof seal. The two oil resistant Side Seals act against the Float Body to likewise form a positive seal.

The efficiency of the Baker Bakwik Drill Pipe Float has been proved in thousands of wells in oil fields throughout the world and is considered standard equipment where a positive back-pressure valve in drilling string is desired.

STRONG, SAFE VALVE ASSEMBLY CONSTRUCTION

Bakwik Drill Pipe Float Valve Assemblies are constructed of a minimum number of essential parts, each designed to give long, satisfactory service. The Cage is made of tough, abrasion-resistant steel, and the unrestricted opening through it is approximately the same area as the fluid passage through the tool joints. The Valve is made of special alloy iron, cast integral with the steel stem. Both Valve and Valve Seat are ground to a perfect fit. The Valve Cage is constructed of close grained grey iron, carefully machined for accuracy. The Valve Spring is designed to perform long, efficient service. The two Side Seals and one Valve Seal are made of oil resistant packing, and afford maximum wear under all operating conditions.

VALVE ASSEMBLY PARTS



ALSO OF IMPORTANCE . . .

is the fact that the Baker Bakwik Drill Pipe Float can easily be placed at any position in the drilling string; that the unit is designed for long life; that the Valve Assembly can be quickly and easily serviced on the rig floor; and that replacement parts can be secured at practically any Supply Store or Baker Warehouse.

BAKER OIL TOOLS, INC.

Main Office and Factory: 6000 So. Boyle Avenue
P. O. Box 127, Vernon Station, Los Angeles, California

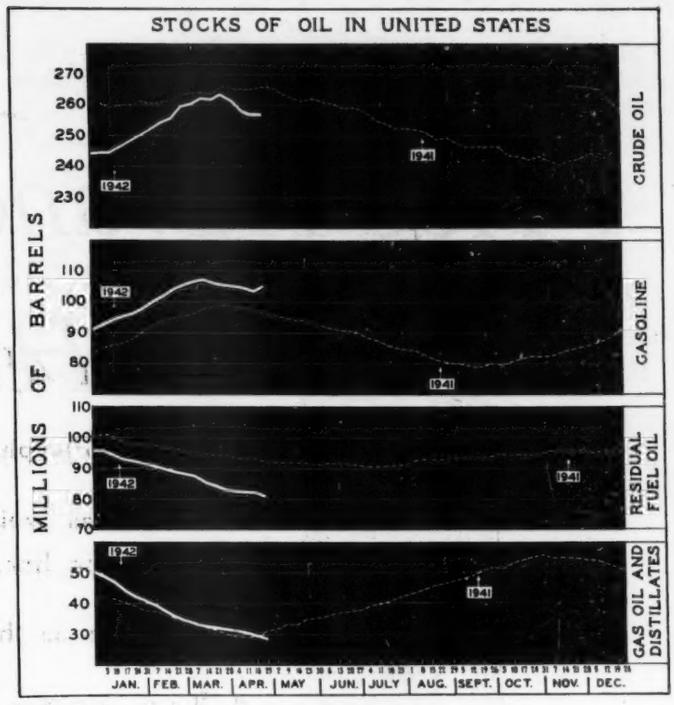
Central Division Office and Factory: 6023 Navigation Boulevard
P. O. Box 3048, Houston, Texas

Export Sales Office: 19 Rector Street, New York, N. Y.

SEE PAGE 293 of the 1942 BAKER or Composite Catalog

Trends

Blight of War Spreads To Most Operations of The Petroleum Industry



THE blight of war on operations of the petroleum industry became deeper and more extensive this week. Operating phases which, on superficial examination, appeared relatively immune are caught in the necessity for readjustments that may presage even more radical changes in the future.

Confirming evidence was given by the Office of Price Administration that adjustments in prices will be slow and tedious in compensation for the higher costs of operations. The time lag between industry acceptance of more expensive transportation mediums and the OPA's acknowledgment of conditions in the form of compensatory product prices is causing much concern.

The East Coast industry outlay for higher cost transportation was approximately 12 million dollars in April in excess of normal. The advances authorized last week are only partial compensation. The outlook is for expanded use of railroad transportation and for every additional barrel of petroleum so moved the industry pays from 71 cents to $1.46 more than the normal tanker rate. Consequently, the industry's transportation-cost increases are in direct proportion to the volume shipped.

The long-range outlook for petroleum transportation costs is dependent on freedom with which the industry is allowed to tackle the problems. Arrangements for several of the OPC pipeline subcommittee's projects are virtually complete but fruition depends largely on the freedom with which the industry is allowed to proceed.

Present overland and inland-waterway facilities now in service fall about 400,000 bbl. per day short of furnishing the minimum requirements. To make up this deficit by overland mediums would require an increase of nearly 70 per cent in the tank-car movement or a total of approximately 75,000 cars. There are serious doubts that railroads could accommodate an increase of such proportions.

Operating aspects are reflecting to an increasing extent the insufficiency of transportation. Two of the country's largest producing states entered appeals from the May quotas certified by OPC but they were rejected. Refiners in Districts 2 and 3 have been asked to make substantial changes in their operations. Here again, the issue of product-price compensation is a potent consideration. Refiners in District 2 have been asked to adjust operations effecting a reduction of 20 per cent in the yield of gasoline compared to last year's averages. District 3 refiners are expected to reduce crude runs to an average of 70.5 per cent of the daily throughput in the last half of 1941. Both adjustments are to be made without disturbing maximum production of war products.

CRUDE PRODUCTION *3,345,835 bbl. daily average—down 246,310 bbl. One year ago 3,498,620 bbl.*

CRUDE STOCKS *257,073,000 bbl. as of April 25—down 490,000 bbl. One year ago 265,160,000 bbl.*

GASOLINE STOCKS *102,897,000 bbl. as of April 25 — down 605,000 bbl. One year ago 96,172,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *81,107,000 bbl. as of April 25—down 1,470,000 bbl. One year ago 92,324,000 bbl.*

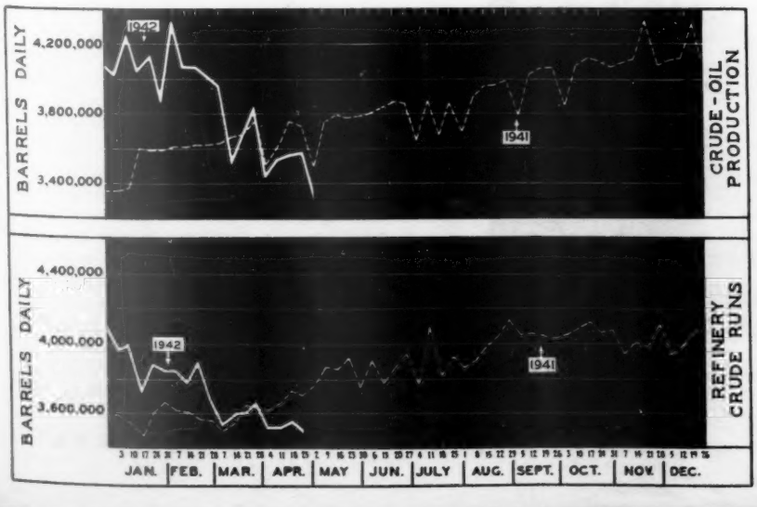
GAS OIL AND DISTILLATES *29,240,000 bbl. as of April 25—down 689,000 bbl. One year ago 31,066,000 bbl.*

REFINERY RUNS *3,506,000 bbl. daily week ended April 25—down 42,000 bbl. One year ago 3,709,000 bbl.*

Note.—Report on refinery stocks for week ended May 2 delayed.

DAILY AVERAGE PRODUCTION FOR WEEK

	May 2, 1942	May OPC recommended production	Apr. 25, 1942
Arkansas	73,620	74,000	73,505
California	621,750	673,800	645,250
Colorado	8,150	7,900	4,975
Eastern fields	117,300	123,300	119,750
Illinois	294,985	329,200	298,025
Kansas	255,300	259,300	253,200
Louisiana	314,340	298,600	317,530
North Louisiana	*81,840*	.....	*77,680*
Louisiana Gulf Coast	*232,500*	.....	*239,850*
Michigan	63,200	60,500	60,800
Mississippi	91,240	48,100	94,735
Montana	21,590	25,200	21,425
Nebraska	3,900	4,500	3,900
New Mexico	86,510	73,300	86,750
Oklahoma	404,650	438,500	400,750
Texas	896,500	960,000	1,118,550
East Texas	*146,400*	.....	*225,850*
West Texas	*140,150*	.....	*190,200*
North Central Texas	*161,800*	.....	*147,550*
East Central Texas	*73,900*	.....	*79,450*
Texas Panhandle	*78,500*	.....	*90,050*
Texas Gulf Coast	*237,150*	.....	*313,950*
Southwest Texas	*58,600*	.....	*71,500*
Wyoming	92,800	98,300	93,000
Total United States	3,345,835	3,474,500	3,592,145
Total production, Jan. 1-May 2, 1942	470,398,140 bbl.		
Same period last year	440,044,250 bbl.		



Price Advances Meet Only Portion of Higher Costs

By J. P. O'DONNELL

NEW YORK. — Increases in gasoline and fuel-oil prices allowed April 28 by the Office of Price Administration were substantially less than needed by the industry to offset increasing transportation costs. It is estimated that increased costs to the industry in the week ended April 18 when a record of 18,651 cars were loaded aggregated almost $600,000 per day owing to the excess of railroad freight charges over basic tanker rates alone. Other costs would raise the total to more than $700,000 or an annual bill for the oil industry of $255,500,000.

Last week's advances were the third allowed by the OPA to offset higher transportation costs. The first was authorized January 21 when gasoline was raised 0.3 cent per gallon. On March 25 gasoline and No. 2 fuel oil were raised 0.5 cent, other light fuels and distillates, 0.4 cent per gallon and Bunker C fuel oil 20 cents per barrel. The advances last week were 0.4 cent for gasoline, 0.2 cent per gallon for No. 2 and diesel fuel and 25 cents per barrel for residual oil.

These changes may be summarized as follows:

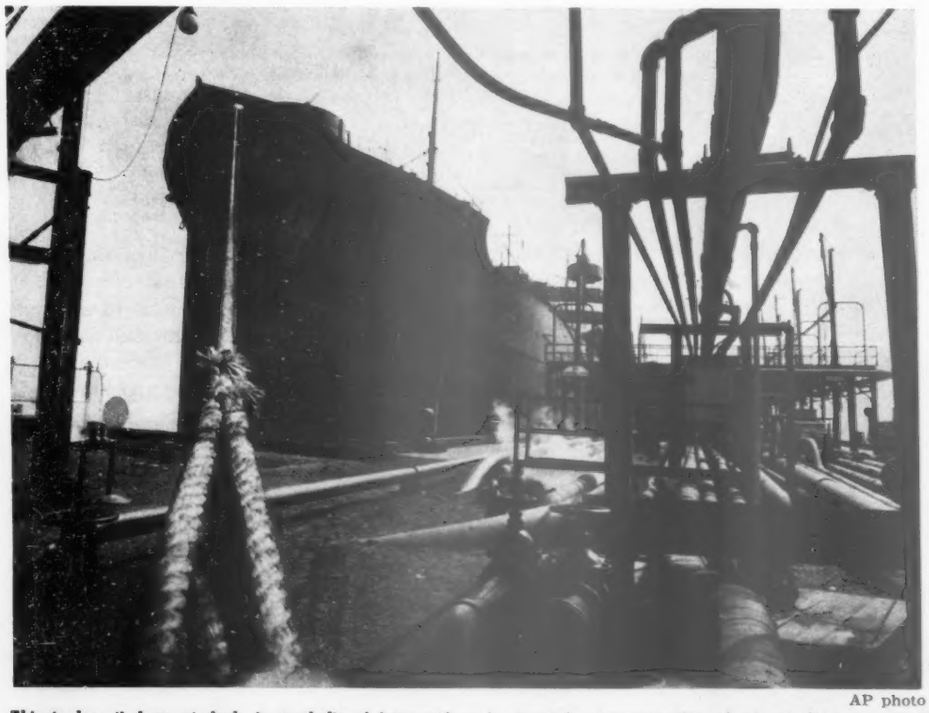
(New York Harbor)	Increases			
Per gallon (cents):	Jan.1	Apr.29	Per gal.	Per bbl.
Gasoline (72-74 oct.)	8.0	9.2	1.2	50.4
Kerosene	5.3	5.7	0.4	16.8
No. 2 fuel oil	5.2	5.9	0.7	29.4
Diesel oil	5.2	5.8	0.6	25.2
Per barrel (dollars):				
Bunker C fuel oil	1.35	1.80	..	0.45

In contrast to these advances which range from 16.8 cents per barrel to 50.4 cents, are the margins between present rail costs and basic transportation rates which the advances are designed to offset. Rail rates from the Texas Gulf or from the Chicago area to New York range from approximately $1.11 to $1.86 per barrel for gasoline and kerosene, from $1.06 to $1.65 per barrel for light fuel oil, from $1.06 to $1.65 for residual fuel oil and crude rates range from $1.46 from East Texas to $1.52 from the Gulf Coast to New York. When the basic crude rates of from 40 cents for gasoline to 48 cents for Bunker C are deducted from these rates, margins of from 58 cents to $1.46 per barrel remain.

Daily Cost to Industry

It is impossible to obtain a completely accurate picture of the cost to the industry of the rail shipments due to the differences in volumes, products and points of origin and destination. However, calculations based on average rates from the principal shipping points to the principal destinations provide some interesting data. Applying these figures to the record shipments of the week of April 18 when 7,699 cars of crude oil, 4,326 cars of gasoline, 1,287 cars of kerosene, 1,722 cars of distillate fuels, 3,076 cars of residual fuel oil and 541 cars of other products were loaded, the following estimates of the daily cost to the industry are reached:

Product—	Cost
Crude oil	$240,000
Gasoline	150,000
Distillates, etc.	90,000
Residual fuel oil	88,000
Other products	12,000
Total	$580,000



AP photo

This tanker, tied up at dock, is symbolic of interruptions in coastwise transportation of oil, resulting in use of more expensive overland facilities

These costs will fluctuate widely because of the factors mentioned in the preceding paragraph and also owing to the variations in the number of cars loaded. The number of cars loaded dropped to 17,575 in the week ended April 25, indicating deliveries of 564,910 bbl. against 18,651 cars, equivalent to 599,500 bbl., in the preceding week. However these shipments are expected to rise again in the future and as they do the total cost to the industry will rise. Last week's decline is attributed in a large measure to a readjustment of traffic undertaken to increase deliveries of heavy fuel oil, shipment of which has increased in volume 10 times in the past 6 weeks.

While the excess of rail rate over basic tanker rates represents by far the greatest portion of the increased cost to the oil companies, there are other important factors. Previous to the withdrawal of all tankers from the Gulf-north-of-Hatteras service increased costs of transportation by means of tankers is estimated to have aggregated approximately $50,000,000 in the first quarter. Such losses in the future are expected to be borne by the Government but those of the last quarter were absorbed entirely by the industry. These were accounted for by the addition of surcharges, seamen's bonuses, and insurance. Surcharges alone had the effect of raising tanker rates on gasoline from 40 cents per barrel to $1.20 and on Bunker C oil from 48 cents to $1.44.

Another item of major consequence in costs resulting from the transportation situation is the addition of lighter oils to residuals to raise heavy fuels from 8° to 14° gravity. This has added tremendously to the cost of supplying heavy-fuel-oil consumers and in their application to the OPA for higher prices, the oil companies sought an increase of 20 cents per barrel to offset this additional cost. In aggregate these costs have become so great that a number of the larger independent distributors who do not have the reserve of the major oil companies are expected to be forced out of business.

Tank Cars Chief Haulers

With the elimination of tanker deliveries for the time being, the major sources of gasoline supply for the East Coast shortage area are tank-car shipments and the production of refineries on the East Coast and the Appalachian area. In the week ended April 18 the indicated tank-car deliveries of gasoline averaged 140,000 bbl. per day, while the present production at East Coast and Appalachian refineries is estimated at 200,000 bbl. per day, a combined total of 340,000 bbl. This was approximately the situation at the beginning of May. Last year in May, in contrast to current tank-car deliveries of 140,000 bbl. per day, there were tanker deliveries of 435,000 bbl. per day and, in addition, East Coast refineries alone produced an average of 225,000 bbl. of gasoline per day. This was a total of 660,000 bbl. of gasoline against 340,000 bbl. obtainable now from the principal sources. Since demand for gasoline in what is now District 1 averaged 657,000 bbl. per day in May 1941 some appreciation of how drastic ra-

This Week...

Pacific Coast refiners send record volume of products by tank cars into Pacific Northwest territory. Situation there improving. Restraints on motor-fuel consumption may be eased.

●

All product prices pegged at highest retail, tank-car and tank-wagon levels prevailing in March by OPA Order 137. But special areas, like East Coast, retain individual treatment.

●

Texas and Kansas denied appeals for higher crude-oil allowables. Texas operates under temporary order, expiring next Sunday.

●

Refiners in Districts 2 and 3 receive special OPC instructions. Former group asked to cut gasoline yields from crude 20 per cent; latter to cut total crude runs nearly 30 per cent.

●

Coordinator Ickes hints at new transportation developments. Practicality of concrete and wood barges discounted. Tells Cole subcommittee that defense line needed but is pessimistic about availability of steel.

●

Industry warned to arrange affairs on assumption that no tankers will be available for coastwise shipments.

●

Tank-car shipments to East Coast dip 5.7 per cent to average of 564,750 bbl. daily in week ended April 25. Slump blamed on backhauls and weather.

●

Natural-gas industry assured use will be found for butane and butenes in 100-octane gasoline and synthetic-rubber programs.

●

Nation-wide rationing gaining adherents in Washington as tire and car saving medium. OPC continues opposition to curtailment in areas of ample supply.

●

Jurisdiction given ODT over all forms of transportation, application of authority obscure. Scope of order embraces all vehicles.

●

Security Division, to deal with plant protection, to be created in OPC, probably under direction of W. D. Mason, Sun Oil Co.

●

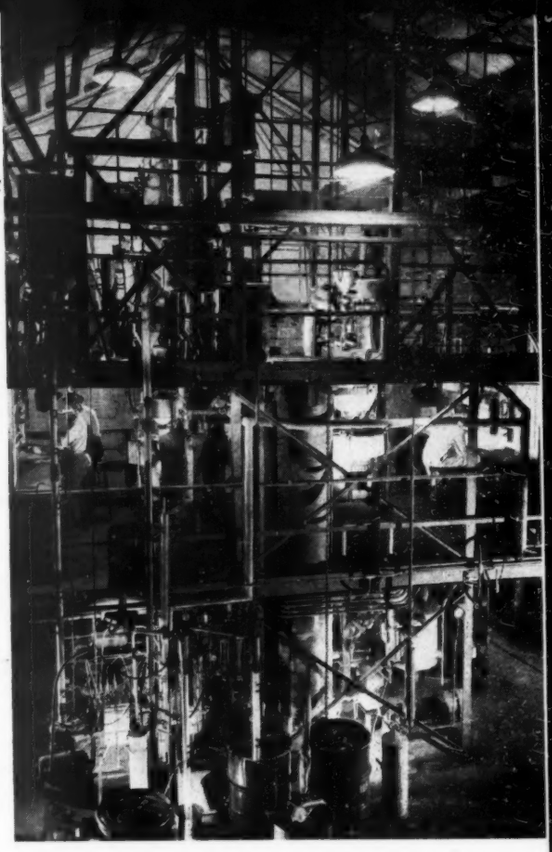
Full division status for natural gas and natural gasoline, rather than section of production, considered by OPC.

●

Abandonment of wells capable of paying operating expenses prohibited by new OPC order.

●

Consumption of heavy fuel oil on East Coast reduced 11,000,000 bbl. annually by conversion to other sources of heat.



DEMAND FOR WAR-SCALE PRODUCTION OF PETROLEUM FRACTIONS THAT WERE HARDLY MORE THAN LABORATORY CURIOSITIES BEFORE HAS INTENSIFIED RESEARCH IN INTRICATE LABORATORY ASSEMBLIES SUCH AS THIS

Coordinator pledges continuation of efforts to obtain adequate price compensation for increasing transportation costs. Price administrator's concessions last week, helpful but insufficient, merely reduce losses at which eastern demand is being supplied.

tioning will have to be to bring consumption in line with demand is apparent.

The advance of 20 cents per barrel on residual fuel oil authorized March 25 and the increase of 25 cents approved April 28 lifts the price at East Coast points a total of 45 cents since petroleum quotations were pegged by OPA. The price of residual fuel oil remains unchanged at 85 cents at Gulf Coast points where most of the refining facilities are concentrated, confirming the attitude of OPA that all advances authorized are exclusively for the purpose of balancing higher transportation costs.

The price administration has not recognized any of the higher cost factors applicable to phases of the industry other than transportation. Maximum prices for Bunker C and No. 6 fuel oils on the East and Gulf coasts in cargo and barge lots f.o.b. refineries and terminals (ex lighterage) established by the amendment follow:

Location—	Max. price per bbl.
Albany, N. Y.	$2.00
New York, N. Y.	1.80
Philadelphia, Pa.	1.80
Baltimore, Md.	1.80
Norfolk, Va.	1.80
Portland, Me.	1.80
Boston, Mass.	1.80
Providence, R. I.	1.80
Charleston, S. C.	1.75
Savanah, Ga.	1.75
Jacksonville, Fla.	1.75
Tampa, Fla.	1.70
New Orleans, La.	.85

●

Price Ceilings Placed on All Petroleum Products

By HENRY D. RALPH

WASHINGTON, D. C.—All petroleum and petroleum products sold in the United States are now under price ceilings established by the Office of Price Administration, together with virtually all other commodities and many services.

General Maximum Price Regulation, issued April 28, applies to all commodities not covered specifically by individual price schedules, and sets as a maximum the highest price of the individual seller during March 1942. It is effective May 11 as to producer, manufacturer, and wholesaler prices, May 18 as to retail prices, and July 1 as to services. It will apply to petroleum specialty products and such other sales as may not be covered in specific price schedules.

Price Schedule 88 remains in effect, with a number of amendments added recently, and continues to govern the selling prices of most petroleum products except specialties and retail transactions.

Motor fuel sold at service stations throughout the country is governed by a new schedule, Maximum Price Regulation 137, issued April 28 and effective May 18. It establishes as a ceiling the highest prices charged by the individual seller during March 1942, except that filling stations in the East Coast curtailment area may add 0.4 cent per gallon to gasoline and 0.2 cent per gallon to diesel fuel.

Temporary Maximum Price Regulation 11, covering motor fuel sold at service stations in the curtailment area, is revoked as of May 18, when the new No. 137 takes effect. In the meantime Amendment 4 to Temporary Regulation 11 permitted slight adjustments in retail prices in the form of additions to March 13 quotations to reflect, as regards gasoline, increased wholesale prices simultaneously granted in Amendment 10 to Price Schedule 88.

Three amendments to Schedule 88 were issued April 29, effective at once. Amendment 8 clarified the base for calculating increases due to freight charges as permitted by Amendment 4 of March 26. Amendment 9 made adjustments in tank-wagon prices for regular and third-grade gasoline in midwestern and western territories.

Of much greater general importance was Amendment 10 which increased established maximum prices for gasoline and fuel oils on the eastern seaboard to compensate for higher transportation costs.

The new retail gasoline Maximum Price Regulation 137 follows the pattern of the General Maximum Price Regulation. The highest March price of the individual seller becomes that seller's maximum, which means that price cuts which continued through March are "frozen" and cannot be raised without going through complicated formal proceedings for adjustment. Detailed rec-

ords must be kept, and each station's maximum price must be posted or kept available for public examination.

The General Maximum Price Regulation contains a number of exemptions, none of which are applicable to the oil industry. Since most oil prices are governed by Schedules 88 or 137, its chief interest to the industry is in the way it effects sales of specialty products, purchases of supplies bought by the industry and not covered by individual price regulations, and services.

"Service" is defined to include "any service rendered or supplied, otherwise than as an employe, in connection with the processing, distribution, storage, installation, repair, or negotiation of purchase or sale of a commodity, and generally, without limiting the foregoing, all services which preserve or add to the value or utility of a commodity." Exempted services include services of an employe to his employer, personal services not rendered in connection with a commodity, professional services, and services of a common carrier or public utility. This provision thus freezes the March prices of services rendered by service stations, such as lubrication, and services connected with drilling and prospecting.

OPA Has Not Fixed Details Of Gasoline Rationing

WASHINGTON, D. C. — Plans for rationing gasoline to some 10,000,000 motorists and other users in 17 eastern states are being perfected by the Office of Price Administration but no announcement of the amount of the basic unit ration is expected to be made for several days.

Price Administrator Leon Henderson will explain the ration system to the House petroleum subcommittee May 8, and may announce then the number of gallons which may be bought on each of the seven coupons of the "A" card which must last the ordinary motorist until July 1 when a more permanent system will be put in operation.

The Office of Petroleum Coordinator Tuesday submitted to the War Production Board its estimate of the amount of gasoline to be available in the rationing area, but this figure was not revealed nor was it known what other data WPB and OPA might use in fixing the basic ration.

By executive order May 4, the Office of Defense Transportation was given authority to control movements of all vehicles where necessary to conserve tires. ODT has already ordered curtailment of merchants' deliveries, full loading of trucks, and consolidation of common and contract carrier truck movements, and further restrictions on vehicle movements may be ordered which will reduce gasoline consumption nationally.

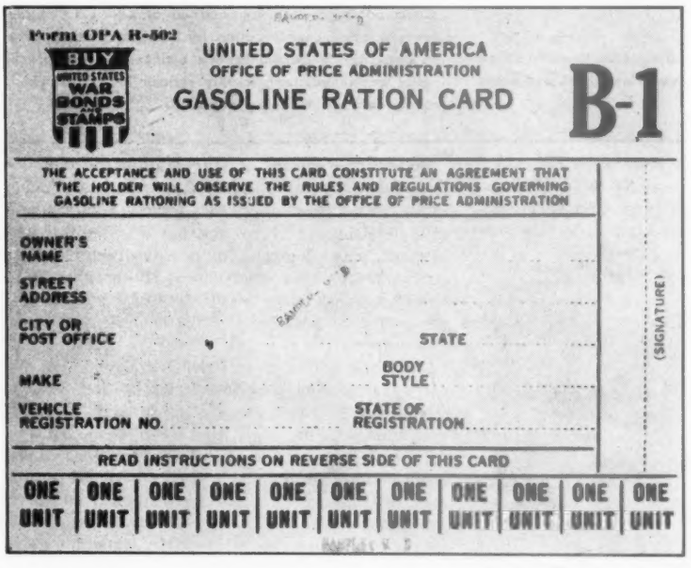
ODT and OPA issued a joint statement explaining that all commercial and governmental users of gasoline are exempt from card rationing but are subject to ODT orders for eliminating nonessential driving. The statement said in part:

"Trucks, buses, and other commercial vehicles will not need ration cards to make gasoline purchases, and do not need to register. They are to be served gasoline in their tanks as usual, however, to avoid delay and confusion in the case of vehicles used commercially and in governmental service, but which may not be clearly marked, it has been provided that 'X' ration cards may be obtained. Such a card will enable them to make whatever gasoline purchases they need 'for essential AEE.'

"The regulations provide also for the sale of bulk quantities of gasoline for use in motor vehicles and boats and for nonhighway purposes.

"Purchase of such bulk quantities may be made by filling out the appropriate certificates, which will be kept by the dealer or supplier. In the category of nonhighway purposes, gasoline may be used, for example, for farm tractors and gasoline engines, and for outboard motors. All such purchases can be made without restriction as to quantity, except in the case of inboard motorboats. The certificates will be filled out at the time of purchase."

The regulations on bulk sales cover purchases made by all truck operators, including operators of interstate vehicles.


Form OPA R-502

BUY UNITED STATES WAR BONDS STAMPS

UNITED STATES OF AMERICA
OFFICE OF PRICE ADMINISTRATION
GASOLINE RATION CARD

B-1

THE ACCEPTANCE AND USE OF THIS CARD CONSTITUTE AN AGREEMENT THAT THE HOLDER WILL OBSERVE THE RULES AND REGULATIONS GOVERNING GASOLINE RATIONING AS ISSUED BY THE OFFICE OF PRICE ADMINISTRATION

OWNER'S NAME
STREET ADDRESS
CITY OR POST OFFICE
STATE
MAKE
BODY STYLE
VEHICLE REGISTRATION NO.
STATE OF REGISTRATION
(SIGNATURE)

READ INSTRUCTIONS ON REVERSE SIDE OF THIS CARD

ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT | ONE UNIT

This sample rationing card, providing for 11 units of gasoline, is designed for one of the special groups of motorists whose position in the war program necessitates a certain amount of essential driving. There are five other types, including the basic seven-unit cards for the average nonessential automobile operator

NATURAL-GAS FEATURES IN THIS ISSUE

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Nearly 11,000,000 Bbl. of Heavy Fuel Saved by Conversion

WASHINGTON, D. C.—More than 10,800,000 bbl. of heavy fuel oil are being saved annually by East Coast consumers who already have voluntarily converted to coal and other fuels, the Office of Petroleum Coordinator announced Monday.

This is an increase of almost 8,000,000 bbl. since April 3, when consumers of heavy fuels had converted facilities burning 3,000,000 bbl. a year.

Deputy Coordinator Ralph K. Davies estimated that probably another 20,300,000 bbl. a year can ultimately be saved by further conversions.

About 135,000,000 bbl. of residual oil, including Nos. 5 and 6 and Bunker C, are normally used annually by East Coast industries, apartment houses, hotels, and other consumers.

"Already 268 individual concerns have converted facilities amounting to an annual saving of 10,796,030 bbl. of heavy fuel oil a year," Mr. Davies said. "Replies to a recent questionnaire indicate that 865 more firms can convert to other fuels and thus save an additional 20,300,000 bbl. a year."

OPC officials are also studying the possibilities of conversion by 1,613 other firms known to use 24,109,420 bbl. of heavy fuel oil yearly.

Humble Reduces Runs From Southwest Texas Fields

HOUSTON, Tex.—Humble Oil & Refining Co. announced a 50 per cent reduction in its purchases of all grades of crudes in the Southwest Texas district, effective May 2. On February 20 the company cut its purchases of low-octane types of crude in the district 50 per cent.

H. C. Wiess, president of the company, stated that the February reduction was made because of the acute shortage of transportation facilities and the accumulation of excessive stocks of high-gravity, low-octane crudes in Southwest Texas.

Of the general reduction, Mr. Wiess said: "The transportation situation is now even more acute and the physical limitations upon our storage capacity require that this program of reduced purchases be extended to all other crudes in Southwest Texas."

"Accordingly, effective 7 a.m. May 2, 1942, and continuing thereafter until further notice, we will purchase only 50 per cent of the current allowable production from all fields to which we are connected in Southwest Texas, being Railroad Commission Districts 2 and 4."

"This reduction, of course, applies to takings from our own properties as have all previous similar reductions."

Gas Industry Assured of Vital Role in War Program

PETROLEUM COORDINATOR ICKES

COORDINATOR'S PUNCH LINES . . .

". . . . we should henceforth operate on the theory that there will be no tankers available for East Coast service."

". . . the natural-gas and natural-gasoline industries have completed an illuminating survey of possibilities for . . . 100-octane gasoline, toluene and synthetic rubber . . . Steps will be taken to assure the full utilization of the resources of these industries . . ."

". . . the Office of Petroleum Coordinator . . . was created to meet an emergency . . . it will be discontinued when the emergency ends."

NEW ORLEANS, La.—Cooperation among the various units of the oil and gas industries and state and federal governments is needed to supply fuel required by fighting forces and war industries, Petroleum Coordinator Ickes said in an address here before the Natural Gas Section, American Gas Association, banquet May 6.

"If it is true," he declared, "and I have heard it said, that the oil industry and all of its related branches, including your own, gave the country its first and best lesson in wartime teamwork, it was due, I have no doubt, to the practice you had during those days when, together, you were learning the alphabet and the subsequent lessons of your industry. In doing those things, you were not planning for war, yet you were, surprisingly enough, making it possible for the country to be ready if war should come at least so far as your industry was concerned.

"The East Coast oil industry is now organized to operate as a unit in meeting the essential petroleum needs of that area and it is doing a magnificent job in developing every available means of moving oil overland and by inland waterways.

"We feel that it is only prudent, however, to prepare for the day when it may be necessary for us to rely entirely on land and inland water transportation to supply oil to the eastern seaboard. I believe that the soundest national policy now dictates that we should henceforth operate on the theory that there will be no tankers available for East Coast service.

"We are making many other moves which I cannot explain now, but I do want to say that there are hundreds of men in the oil industry today who are devoting their full time, their training, and experience in order to develop new ways of moving oil Northwest and East.

"Changes of such variety and magnitude cannot be tossed into the placid pool of our national life without setting in motion a whole series of widening ripples. The oil which we cannot move to the East Coast may pile up in your Gulf Coast refineries. As the tanks fill up, it becomes necessary to curtail refinery runs or to pour refined products back into the ground. As refinery runs are curtailed, it becomes necessary to restrict further the production of crude oil. As crude-oil production is curtailed, the income of the crude-oil producer is lowered. That makes for problems with the banker and the merchant and affects all phases of our economic life—mine as well as yours. But all adjustments must be made with an eye fixed upon war requirements, everything must be sacrificed to the united resolve of the American people to win the war.

"We must also plan and conduct our operations so as to provide a sufficient supply for an indefinitely long period into the future. It is because of the conservation that we have practiced in peacetime that we now have sufficient reserves of precious war resources. We must continue our conservation practices in order to have sufficient reserves to meet postwar reconstruction problems.

"In some quarters there seems to be an unjustified feeling that state laws and the functioning of state regulatory bodies are no longer necessary or important on the ground that the federal Government has taken over full control of the gas and oil business. I can assure you that there is no basis for such a point of view. It has been necessary to impose, for the period of the war, a certain amount of federal regulation of the oil and gas industries just as it has been necessary to regulate other essential industries. However, close integration of the full efforts of all parties concerned will be required if the gas and oil industries are to meet the challenge of this war.

"The War Production Board has issued, upon my recommendation, orders that are designed to achieve the desired conservation of our oil and gas resources, and I am glad that the oil and gas industries have complied willingly and wholeheartedly. Recommendations to individual units in the gas and oil industries, as well as to interested state regulatory bodies, designed to assure that these exhaustible natural resources will be developed in the most efficient manner have been accepted cheerfully and voluntarily. In no instance has any state been ordered to do thus and so. We have indicated what the national program requires of each state, leaving it to the states themselves to work out their own problems of how best to do their part.

"But the states must have effective laws, properly administered, for speedy and decisive results, if we are to continue to rely solely upon their voluntary cooperation. It would be highly desirable if each state adopted, where necessary, or revised and strengthened its gas and oil-conservation laws. A record of successful administration during the war will demonstrate fully that a state is able to regulate and control its petroleum operations.

"On many occasions, I have told the Petroleum Industry War Council and other groups that it is the responsibility of the industry to solve the problems created by the war with as little assistance from the federal Government as possible. The industry must devote its talents and its energies to war production. The Government must provide the industry with the plan by which the talents and energies of the industry can be guided.

"As petroleum coordinator, I have attempted, through the medium of industry advisory committees, to achieve cooperation between the Government and the petroleum industry. I have selected the personnel of these committees from the nominations which those in the industry themselves have made. It is my sincere belief that only through the cooperation of Government and industry, carried out in good faith and with mutual trust, will we be able to achieve the smooth action that results from coordination and that is required for the winning of the war. That my confidence that this was an attainable objective was not misplaced is proved by the conscientious and intelligent work that is being done by the industry committees and representatives of the Government.

"At my request, representatives of the natural-gas and natural-gasoline industries have completed recently an illuminating survey of possibilities for the manufacture of the components of 100-octane gasoline, toluene, and synthetic rubber. An ample supply of these essential war products may prove to be the margin that will mean victory more quickly for the United Nations. Steps will be taken to assure the full utilization of the resources of these industries making these products in the production of these vital materials.

"I like to think that I can talk to any group of men in the petroleum industry without having to deny that I have jumped into a Trojan horse to take the citadel. I do not want to question the intelligence of those who, innocently, or impugn the motives of those who, not so innocently, used to spread abroad the suggestion that I wanted to run the oil industry. If there still be those who so believe, let them get what pleasure they can out of their end of suspicion. I am sure that an overwhelming number of men in the industry believe as implicitly as I do that the Office of Petroleum Coordinator is an agency that was created to meet an emergency and that it will be discontinued when the emergency ends."

Speakers at Gas Meeting Tell Of Industry's Two-Fold Job

By C. O. WILLSON

NEW ORLEANS, La.—The natural-gas industry is rapidly adjusting all phases of its operations to a full-war basis. This fact was apparent from the statements of its leaders and the reports of its technicians at the thirty-seventh annual convention of the Natural Gas Section of the American Gas Association held here May 4-7 inclusive. Practically all of the papers covering activities of the industry from the finding of new reserves to the most efficient use of gas in kitchens, had a bearing on the changes which the industry is bringing about in its operations so that it can most effectively do its part in the war plans.

The keynote of the meeting was sounded by J. French Robinson, chairman of the Natural Gas Section, and president of the East Ohio Gas Co. In a plea that the industry so conduct its operations that the basic American economy is retained during the war and afterwards, Mr. Robinson made three general observations regarding the duties of natural-gas operators to their customers as follows: "The first is that our customers look to us for help now more than ordinarily. The second is that if we merely wave the flag and shout how patriotic we are, and how many bullets natural gas is contributing to the cause, we are not discharging our proper obligations to our customers, our country or our stockholders. My third is that, in helping people get better results with natural gas by our teaching them the values and practices of better gas utilization, we are helping them through the war, we are contributing materially to a better economy of this great energy resource which is a war effort itself, and we are preparing for better living, all around, after the war."

He concluded, "The limitations of war are necessarily the limitations of our physical efforts along all lines. This should go without saying. But to hold our breath 'for the duration' is as fatal to ourselves as it will be ultimately to the war we are fighting and to the cause which we are fighting to preserve."

Former Trials Only Rehearsals

George S. Hawley, president of the American Gas Association, and president of the Bridgeport Gas Light Co., Bridgeport, Conn., also stressed the war responsibilities, stating, "Today we face conditions so serious that in retrospect all previous experiences seem mere dress rehearsals leading up to the greatest performance of all times."

He traced the war plans of the natural-gas industry from the time the association set up its first committee on national defense 2 years before the war broke out. "The gas industry cannot, like other industries," Mr. Hawley pointed out, "be wholly converted from a condition of peace to one of war, for in addition to the vital part this industry plays in the fabrication of the materials of war, we must in the interest of public health, nutrition and morale, maintain an uninterrupted and high standard of service to the civilian population most of whom are engaged in war work in some form. This we have been able to do."

The reports presented at the meetings revealed that the services of natural gas are part of the war program in many ways not familiar to those outside the industry. They include fuel to large industrial units which are using natural gas for the first time in the manufacture of war goods. In many instances representatives of natural-gas companies have gone into these plants and have shown the operators how natural gas is used in processing operations.

It was also shown that industry's representatives are going to the Army camps suggesting menus, giving courses in nutrition and mess management, the arts of cooking and baking, practice in field rations and the case of field equipment. These services have been highly praised by officers of the Army and Navy who are placing more stress than ever before on the proper feeding of soldiers and sailors.

Production and Transmission Sessions

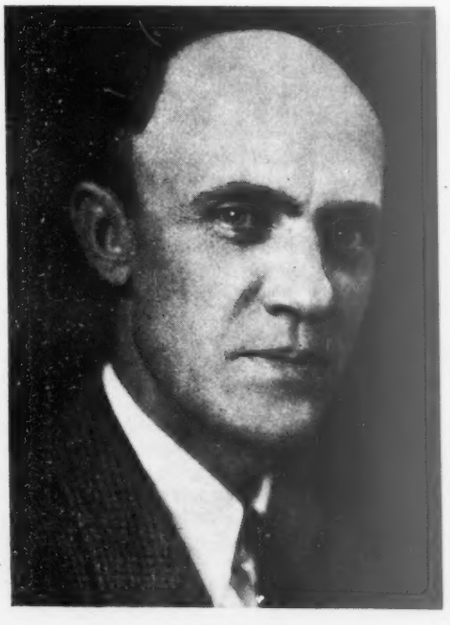
Discussions at the production and transmission sessions emphasized the steady progress under way in the production and transportation of gas from the fields to the consuming centers. There were no statements made relative to the new projects which have been projected over the past year calling for the laying of new lines connecting the fields of the Southwest to the industrial centers of the East and Southeast. Information away from the meetings was that the construction of all these new lines including the large looping programs for existing lines will be postponed until steel now required by the war industries can be made available. One executive expressed the opinion that in obtaining steel for new pipe-line construction the oil industry, due to the tanker shortage, would take precedence over the gas lines.

The industrial demand for natural gas in most areas east of the Mississippi River far exceeds the supply and it is agreed that to take care of as much of this demand as possible it will be necessary to reduce household use. It was pointed out in this connection that while the number of domestic customers increased 5 per cent last year the gain in consumption by this class of users was less than 1 per cent. This development was brought about by the better use of appliances under the direction of gas companies which now carry the slogan, "It is patriotic to use gas wise-

Bay and Wertz Nominated for Top Posts in A.G.A. Section

NEW ORLEANS, La.—Burt R. Bay, president of Northern Natural Gas Co., Omaha, Neb., and Ralph E. Wertz, president of Amarillo Gas Co., Amarillo, Tex., have been nominated chairman and vice chairman, respectively, of the Natural Gas Section of the American Gas Association. Nominations will be acted upon at the annual A.G.A. meeting in the fall. Mr. Bay has served as vice chairman of the Natural Gas Section during the past year and has taken an active part in association activities for several years.

Mr. Wertz is one of the pioneer gas men in the Texas Panhandle. He has been in charge of his company's operations for several years and has been active in conservation programs in the Panhandle and in national affairs of the industry.



BURT R. BAY

RALPH E. WERTZ

ly." Because the large reserves of the Southwest cannot be tapped at this time with additional lines to the East and North, special attention is being paid as to how the production in the eastern part of the country can be enlarged and maintained. The program of natural-gas operators in conserving materials as discussed at the technical sessions, in many ways, parallels that of the petroleum industry.

Edward L. Love, vice president of Chase National Bank, brought a note of warning in regard to the need of sound financing during this period. He said, "A part of the industry is presently faced with enforced divestment of ownership. The unprecedented industrial expansion to meet war requirements has imposed a corresponding obligation on the part of the natural-gas industry. It will be necessary for many companies to accomplish the impossible and to add facilities to their present plants which normally would never be considered and which, from a strictly business point of view, are unwarranted. Economies should be effected wherever possible. Moreover it may be necessary—as it already has been in some cases—to modify dividend distributions and rearrange sinking funds so as to weather the war period."

E. H. Poe, secretary of the Natural Gas Section, New York City, is in charge of the convention plans. Mr. Poe was praised for the service which he has rendered the natural-gas industry over the past year. A large part of his time has been spent in Washington.

J. French Robinson, president of the East Ohio Gas Co., chairman of the Natural Gas Section, presided at several of the general, luncheon and committee meetings

E. H. Poe, secretary of the section, arranged details of the program

Natural Gas and Gasoline Given Full Division Standing by OPC

WASHINGTON, D. C. — Organization of a natural-gas and natural-gasoline division of the Office of Petroleum Coordinator instead of a unit of the Production Division was described in a paper prepared by Assistant Deputy Coordinator R. E. Allen and presented at the New Orleans gas meeting.

Among other things, this division will handle problems involved in discovery, production, distribution and transportation of natural gas, utilizing critical materials, and will cooperate with other federal agencies. It will also deal with the entire problems of natural gasoline and its essential role in aviation gasoline, synthetic rubber, and toluene, including construction of natural-gasoline-extraction plants.

Personnel of this new division has not yet been fully decided upon, Mr. Allen said, but Paul Raigorodsky, Thomas Weymouth, Frank Brewster, Virgil Bowyer, Robert Drucker, James Pew, D. E. Buchanan, and others now in the unit, will remain in high and responsible positions. Other personnel will be drawn from the industry.

Supply of 5.5 Gal. Per Week In Sight for Eastern Drivers

WASHINGTON, D. C.—If all tanker deliveries to the East Coast are stopped, the available gasoline supply for motorists in OPC District 1 will average only 5.4 gal. per passenger car per week for the next 5 months, the Petroleum Industry War Council was told Tuesday by its economics committee.

Since essential users would get more, this would mean considerably less for nonessential and intermediate users. This average is based on tank-car deliveries of 800,000 bbl. per day, which the committee says may be realized although the recent high is 600,000 and also includes some additional barge and pipe-line movements. Even so, and with all nonessential uses of all products eliminated, there would be a deficit of 200,000 bbl. per day in all products, and when deliveries increase, stocks should be built up before nonessential use is permitted.

The committee estimated that of passenger-car gasoline consumption in the East, 40 per cent is nonessential, 20 per cent intermediate, and 40 per cent essential, and that essential uses this year are 5 per cent over last, but urged prompt consumer surveys to get accurate figures.

The committee estimated the daily average essential demand for all petroleum products in District 1 this year at 1,265,900 bbl., and intermediate demand at 163,000 bbl. The report presented detailed figures to back its conclusion that essential demands in relation to current supplies imply an adjustment both for the industry and the public greater than any heretofore visualized, and if some tanker movement is not provided presently, foreseeable supplies appear inadequate to meet even essential demands. The committee concluded that the best solution to the problem is the construction of large pipe lines from the producing region to District 1.

The council adopted a resolution proposed by its production committee asking revocation of OPC Recommendation 47, which requires reports and certificates before abandoning wells. The report said the industry does not abandon wells still economic to produce, and the recommendation imposes unnecessary paper work.

The council also approved a resolution declaring that the large number of questionnaires and directives from government agencies imposes heavy burdens on industry and slows war work and asking Mr. Ickes to coordinate such as affect the oil industry and have them all clear through OPC before issuance, to eliminate duplications and unnecessary reports.

At the suggestion of the marketing committee, the council changed its container subcommittee to subcommittee on containers and lubricants, and added 10 technical lube experts to the old five members. The new group will consist of five men from District 1, three from District 2, two from District 3, two from District 4, and three from District 5. Appointments are not yet completed. The group is to work with the Army and Navy in simplifying their lube specifications so as to get greater production.

The marketing committee announced that any member of the council may attend and participate in discussions of its meetings and if a committee member cannot be present he may be represented by his top-ranking marketing executive, but such visitors may not legally participate in committee actions. This was so well received by the council that other committees are expected to do the same.

The emergency pipe-line committee reported progress is being made in planning details and preparing to execute promptly each of the seven pipe-line projects involving relaying of old pipe and equipment as outlined in The Oil and Gas Journal April 23, Page 20. In many cases additional problems have been met and some changes in plans will be necessary, but the seven projects combined are expected to move 200,000 bbl. daily to the East in conjunction with rail and barges.

Natural Gas Outlook Clouded By Opposing Forces

By H. STANLEY NORMAN

DEMAND that probably will exceed anything with which the industry has coped in past years but without the concomitant peacetime freedom of expanding facilities were two apparently incompatible aspects spread this week before executives and technicians at the annual meeting of the Natural Gas Division, American Gas Association.

The outlook is circumscribed by numerous restraining forces, including disinclination of the WPB to divert steel from shipping and other war machines that otherwise might be used for expanding transmission facilities. Development of natural-gas reserves is under restraint that compares in rigidity with compulsory wide spacing of oil wells.

In most sections of the country, producers of natural gas are forced to space additional wells in a proven field on units of not less than 640 acres. Blanket exception to the 640-acre spacing provisions of Conservation Order M-68 has been granted in the Appalachian district but even in that area where supplies are particularly acute currently drilled wells are nearly twice as far apart as was commonly practiced in peacetime.

As a partial offset to restrictions on drilling and inability of the industry to proceed with pipeline construction plans, the WPB has limited consumption in all, or parts of 23 states and the District of Columbia.

Industrial Use Exceeds 50 Per Cent

Consumption of natural gas by industrial enterprises has risen sharply during recent years and now accounts for approximately 51 per cent of the total demand. During 1941 industrial consumers used more than 819 billion cubic feet of natural gas, an increase of more than 17 per cent compared to the previous year. Industrial consumers burned more than 7 billion cubic feet of gas in January, the last month for which statistical data are available, which is an increase of nearly 23 per cent compared to the same month in 1941. The sharp increase in industrial consumption is more significant in view of the decline of 5.5 per cent in the number of customers in this classification. The numerical contraction of industrial consumers is a reflection of the federal-fuel program, advocating conversion to other sources of power.

The industrial market for natural gas is subject to less violent seasonal fluctuations than the domestic demand and this, in turn, is one factor accountable for the lower revenue per unit delivered. Revenue accruing to utilities serving industrial customers represents only 34.1 per cent of the industry's aggregate.

Domestic consumption of natural gas last year totaled a little more than 422 billion cubic feet, from which the utility companies derived 54 per cent of their revenue.

Combined industrial and domestic consumers use 77 per cent of all natural gas distributed and the two classifications produce 88 per cent of the revenue.

Numerically, industrial consumers of natural gas are not impressive. The total of 34,600 reported by the American Gas Association in the industrial classification in January 1942 is approximately 0.3 per cent of all consumers reported at 10,433,500, a net increase of 3.1 per cent over the January 1941 figures. Among the 34,600 industrial consumers, however, are some of the most essential manufacturers of war materials, particularly in the eastern part of the country.

In February the WPB issued Limitation Order L-31 stipulating that installation of central space heating equipment should be discontinued in the curtailment areas and that utilities were to refrain from accepting new nonresidential accounts. The order prohibiting installation of space heating equipment, the WPB explained, was directed at the least essential of potential increases in demand for natural gas in the areas of insufficient supplies.

THREE-YEAR TREND OF CUSTOMERS AND DEMAND

Natural-Gas Customers

	1939	1940	1941
Domestic	6,745,600	7,013,000	7,335,000
Commercial	501,100	521,000	536,900
Industrial	38,800	40,700	43,100
Miscellaneous	2,100	2,200	2,500
Total	7,287,600	7,576,900	7,918,000

Natural-Gas Sales

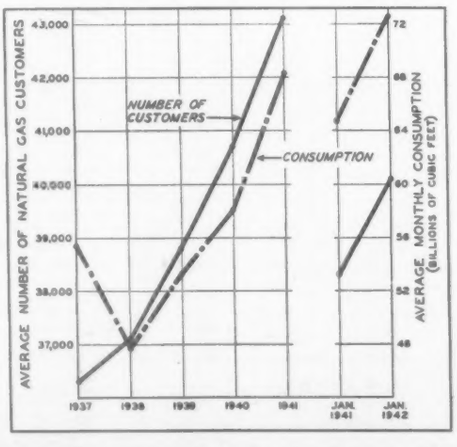
(Millions of cubic feet)

Domestic	373,650	419,532	422,200
Commercial	109,514	122,544	130,104
Industrial	640,256	698,230	819,213
Electric generation	191,296	182,948	202,990
Miscellaneous	15,948	18,438	28,128
Total	1,330,664	1,441,692	1,602,635

GROWTH OF NATURAL-GAS CONSUMPTION IN 10 YEARS

(Millions of cubic feet)

	Dom.	Industrial	Other	Total
1932	321,499	320,396	194,253	836,148
1933	300,936	378,053	185,274	864,263
1934	303,844	455,602	218,486	977,932
1935	321,357	507,967	226,381	1,055,705
1936	340,409	610,027	267,484	1,217,920
1937	360,529	666,359	290,355	1,317,243
1938	352,837	573,962	286,118	1,212,917
1939	373,650	640,256	316,758	1,330,664
1940	419,532	698,230	323,930	1,441,692
1941	422,200	819,213	361,222	1,602,635



Industrial demand for natural gas continues upward

Producers in the Appalachian gas area, consisting of New York, Pennsylvania, West Virginia, Ohio, and Kentucky, were granted blanket exception to M-68 in the middle of February. Spacing restrictions in the original order, requiring development of gas properties on a basis of one well to 640 acres, was modified to permit drilling on 40 and 160-acre units in the five states. Wells drilled to the Onondaga limestone, Oriskany sandstone or Devonian shale producing formations may be drilled on units as small as 160 acres. Other gas-producing horizons may be developed in the five states on a program of one well to 40 acres. Both modified regulations are subject to other requirements concerning consolidation of interests within the unit and observance of minimum measurements from lease lines.

Development of natural-gas properties in the country as a whole declined nearly 40 per cent during the first quarter of the year compared to the final 3 months of 1941. Records of The Oil and Gas Journal show 540 gas-well completions during January, February and March against 888 for the final quarter of 1941. Conservation Order M-68 became effective December 23 and, for practical purposes, may be considered a development factor only since start of this year. Modification of the 640-acre spacing restriction in the Appalachian area, where custom dictated closer drilling, may be responsible for a gradual increase in completions since January. Gas well completions in January were 144; February 171, and March 225.

Transportation Lack Blocks Expansion

Preliminary estimates indicate that the total production of natural gas in 1941, including amounts used in the manufacture of carbon black and for field purposes will reach a total of approximately 3 trillion cubic feet. The industry may have difficulty this year in repeating its record production performance, a question that would not be posed if the producing, transmission and distributing companies had access to line pipe, compressors and other materials required for expansion.

The gas industry is playing a far more vital role in this war than in 1915-18. New large-scale heating processes and treating methods have been evolved and developed which, when applied to the instruments of modern warfare, improve certain equipment demanded by the armed forces.

A modern tank affords a good illustration. Gas is used for more than 15 heating operations in hardening armor plate which must withstand artillery fire and at the same time retain enough resiliency to prevent shattering. The heating cycle for armor plate has been reduced from 400-600 hours prevailing in the first war to about 100 hours in a modern gas-fired treating oven. Gun turrets, 50 ft. in diameter, are annealed in a single gas-fired furnace, consuming more than 1 million cubic feet of gas for each annealing operation. A few of the ways in which gas fuel is used to implement the war production program are: The hardening and drawing of projectiles and gun barrels, annealing cartridge cases, stress-relieving gun turrets, forging aluminum airplane

propellers, carburizing engine parts and melting glass for the manufacture of optical range finders.

These requirements for natural gas by war industries, along with those by steel mills, are the reasons why restrictions have been imposed on the nonessential exxpansion of consumption.

Numerous gas fields in the Appalachian area are in the latter stages of depletion and, denied the steel with which to build new lines from larger fields in the Southwest states, the industry is under obligation to direct supplies to consumers whose products are most essential to war prosecution.

In addition to its obligations as a producer and supplier of fuel, the natural-gas industry is intimately related to the 100-octane gasoline and synthetic-rubber programs. There has been considerable confusion during the early negotiations for production of aviation fuel and synthetic rubber over the position of the natural-gas industry. Movements are under way, however, that may clarify this issue and probably will result in a heavier call on natural-gas producers, distillate-recovery operators, and natural-gasoline manufacturers for butanes and butenes, isobutylene and other fractions needed in the complete program.

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Declining Earnings Reflect Higher Pacific Coast Costs

By L. P. STOCKMAN

LOS ANGELES, Calif.—Financial reports for the first quarter indicate the pressure exerted on California marketers in making deliveries of refined oil to the Pacific Northwest and other areas by railroad and tank truck as compared with normal operations. In the March 1942 quarter one company paid out in wartime expenses, including war-risk insurance, war bonuses to marine crews, excess costs of transportation by pipe line, rail and truck in lieu of tankships, and due to delays in tankship movements, plant protection, and other expenses the sum of $1,109,935. Last year there was no such item so that this amount represents added marketing expenses incurred during the first 3 months of 1942. Other California marketers have incurred similar expenses and it has been estimated that the added costs to wartime operations approximate $2,000,000 monthly and may increase as larger amounts of products are moved by tank truck. Railroad movement into the Pacific Northwest has been averaging 75 cars daily and this service requires the use of 1,350 railroad tank cars. Every available tank truck is being put into operation hauling refined oil into southern Washington and Oregon. It is quite obvious that present operations cannot supply unlimited quantities of motor fuel to motorists in Washington and Oregon and while sales have been restricted to 66⅔ per cent of normal, it is believed probable that a 50 per cent reduction in nonessential civilian consumption will be invoked soon.

The deficits absorbed by California refiners as a result of increased marketing costs is due to the fact that retail prices have been pegged and there is no way of recovering higher expenses from consumers. The logical method of alleviating this condition would be to authorize an increase in gasoline prices throughout the entire section rather than penalize curtailment areas. Present transportation costs to Seattle are over three times the normal when products were moved by water. There is no gasoline available in Hawaii for civilian use and this represents a reduction in the normal area supplied by California producers and marketers. The amount previously mentioned, $1,109,935, as added transportation costs does not include higher drilling and production costs which in many cases have increased from 50 to 75 per cent and increasing inefficiency resulting from the loss of technical men to Army and Navy services.

There has been a slight shortage of crude in the San Francisco refining area but this will be remedied within the next few weeks upon conversion of the Stanpac natural-gas line into an oil line. The Stanpac gas line, which is owned jointly by Standard Oil Co. and Pacific Gas & Electric Co., was laid in 1930 to facilitate the delivery of Kettleman natural gas to the San Francisco Bay region but later the line was connected with laterals from Rio Vista and other dry-gas fields in the central part of the state. Before this large line, which has diameters ranging from 20 to 26-in., can be converted from natural gas to crude oil it will be necessary to lay some additional pipe in order to provide the Rio Vista gas field with an outlet as this field will be expected to step up gas production next winter. An auxiliary line will be laid and connections made with facilities now serving territory adjacent to San Francisco.

Approximately $1,500,000 will be spent in converting the Stanpac gas line into a crude-oil carrier and for the additional pipe needed to change present facilities serving the Rio Vista gas field. It is estimated the Stanpac line will be able to deliver about 125,000 bbl. per day of light refining crude to San Francisco refineries. Plans are under way to patrol the line 24 hours daily and for this purpose shelters containing necessary material and to protect men during particularly inclement weather are being built at frequent intervals along the route.

Conversion of the Stanpac line into a crude-oil line will give refiners complete pipe-line facilities into the San Francisco region. General Petroleum Corp. and Richfield Oil Corp. have crude lines extending into Los Angeles Basin. In addition, Shell Oil Co., Inc., has a crude line extending from Ventura to Wilmington and natural-gasoline pipe line extending between the same points. While these facilities will permit greater flexibility, it will be necessary for refiners to make some additional arrangements because Texas Co., General Petroleum Corp., and Richfield Oil Corp. do not have refining facilities in the San Francisco area and must therefore depend upon Standard Oil Co., Union Oil Co., Tide Water Associated Oil Co., or Shell Oil Co., Inc., to furnish refined products so they may protect their outlets.

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Oil-Field Equipment Export Form Approved by WPB

WASHINGTON, D. C.—A new method of assigning preference ratings to orders for export was adopted last week by the War Production Board. Immediate application of the new method is limited to exports for petroleum enterprises outside the United States and Canada.

Priorities Regulation 9, issued by the director of industry operations, will govern issuance and use of ratings for export whenever appropriate forms are approved for specified industries or products. The most important provision of the regulation is that a preference rating assigned under its terms to a product for export may not be applied without an export license or other authorization to export.

The first approved form issued under the new regulation is Form PD-311, which is an application for priority rating on materials to be exported for the use of the petroleum industry. Preference ratings for export may be assigned to applicants on this form on substantially the same basis as ratings assigned to petroleum enterprises in the United States and Canada under the petroleum industry Preference Rating Order P-98. Ratings assigned on Form PD-311 may also cover materials for construction and maintenance of natural-gas lines, which are not included under P-98.

Applications on Form PD-311 will be processed by the Office of Petroleum Coordinator in cooperation with the Board of Economic Warfare, Lend-Lease Administration, and the War Production Board. Detailed instructions for petroleum companies applying for preference ratings on this form have been prepared by the OPC.

Simultaneously with the issuance of Priorities Regulation 9 and Form PD-311, Preference Rating Orders P-98-a and P-103-a, under which ratings have previously been assigned to exports for the petroleum industry, have been revoked.

When a priority rating is assigned on Form PD-311 the rating may be served on a supplier by a simple endorsement on a purchase order. This endorsement is similar to the method now used for applying ratings assigned on PD-1A and PD-3A certificates, and is likewise subject to the limitations of Priorities Regulation 3, which governs the use of individually assigned preference ratings.

Copies of application Form PD-311 for the use of petroleum enterprises operating outside the United States and Canada, and instructions for its use, may be obtained from the OPC.

NEXT WEEK

The May 14 issue will feature the annual meeting of the Natural Gasoline Association of America, which will be held in Tulsa, May 14 and 15. The issue will include a survey of natural-gasoline and recycling plants, and some of the technical papers.

STATE CAPITALS...

ARKANSAS

FULL DISCUSSION of new regulations requiring 30 days' notice of intention to abandon wells, stipulated in a recommendation issued last week by the Office of Petroleum Coordinator, will be held by the Oil and Gas Commission at El Dorado May 27. The OPC rule is in addition to the present state requirement by which the plugging of wells was left solely to the discretion of the state commission.

Affected most are the old stripper fields of Arkansas now producing their oil through more than 2,500 wells. A number of wells in the older fields are abandoned each month because of natural depletion below a profitable level of recovery or because of water encroachment beyond a point of sound operating practice.

The oil and gas pools operating under state control, containing some 600 wells, the majority of which are flowing, will be affected to some extent by the federal order in that the rule states "any oil or gas well may be abandoned where the production of water from such well tends in any way to diminish the ultimate recovery of petroleum from the particular reservoir."

For some time operators of oil wells in the controlled fields of Arkansas have contended that the production of water should be considered as allowed oil in that the production of water has just as much effect on the reservoir as the production of oil. The commission this week ordered the Tide Water Associated Oil Co. to take remedial measures to correct the large quantity of water being produced by its wells in the Atlanta pool of Columbia County. Large quantities of water are also being produced in the outside tier of wells in the Magnolia field as well as by a great number of wells in the Village field, Columbia County.

CALIFORNIA

A REDISTRIBUTION into 26 oil-producing districts compared with the present 29, was voted by the conservation committee of California Oil Producers at its meeting last week.

The redistricting, recommended in order to provide more equitable representation for new producing areas, is based upon geographical location of producing fields and amount and kind of oil produced, so that each member of the conservation committee will be responsible for representation of approximately equal production interests.

The committee also made E. E. Pyles, chairman of the District 5 production committee, an ex officio member and recommended that no member of the OPC production committee be eligible for membership on the conservation committee. This latter recommendation was made, according to W. H. Farrand, chairman of the election committee, in the interest of relieving members of the production committee from excessive demands on their time.

The conservation committee also voted to continue the April allocation methods into May, these allocations determining the procedure for distributing oil within the respective fields and to the wells. Allocation to pools is made by the production committee on a products basis, so that war requirements for products and production of the type of crude which is best suited to the manufacture of those products, are coordinated.

FOR THE FIRST TIME in more than 3 years, California's taxable gasoline sales have begun to decrease according to the March 1942 report of the state Board of Equalization. March sales amounted to 165,639,049 gal. on which the board assessed a tax of $4,969,171.46 and which represented a decline of $38,508.91 or 0.77 per cent under the income for the same month of the previous year. Reduction in gasoline sales for March was the first tangible evidence of wartime restrictions imposed on privately owned automobiles although sales during February 1942 were only 2.6 per cent above the demand for the same month last year. Prior to this, the average monthly increase had amounted to approximately 10 per cent.

A further decrease is anticipated when April consumption figures are available.

KANSAS

THE CORPORATION COMMISSION set the state production allowable at 259,300 bbl. per day in an order issued May 5, the average output certified by the Office of Petroleum Coordinator. The commission delayed formal action on the May allowable pending final order from Coordinator Ickes on the plea of Governor Ratner for an increase of 50,000 bbl.

Crude-oil purchasers nominated 295,053 bbl. daily in May, according to a report compiled by Theo A. Morgan, conservation director, based on replies from pipe-line companies and refineries. The May nominations were 35,753 bbl. daily higher than the OPC quota and compared with 268,687 bbl. daily in April. The May demand, as reflected by nominations, was the highest in the history of Kansas oil production.

COLORADO

THE PRODUCTION COMMITTEE of District 4, of which R. S. Shannon is chairman, adopted a resolution at last week's meeting in Denver requesting the Petroleum Coordinator to deputize the committee to act as the proration agency.

The committee, if given authority, will cooperate with state officials in Colorado, Wyoming, and Montana. There is no immediate need for proration in these states since the allocations have all been raised for May, but the action was taken in anticipation of any development which might make proration desirable. The committee wants to adopt the formula which provides for the proration of all wells making more than 100 bbl. a day. Wyoming's allocation was boosted 9,400 bbl. for May to 98,300; Montana 1,500 bbl. to 25,200; and Colorado 1,000 bbl. to 7,900.

The increase in allocations for May in Wyoming and Montana is credited to the situation in the Pacific Northwest where there is a shortage of gasoline and fuel oil. Crude from these states is being refined in two plants in Washington and Idaho, but the refiners have had to compete with California refiners in the eastern Washington and northern Idaho markets, although the latter have a long haul as against a short haul from the inland plants. Ralph K. Davies, deputy coordinator, is quoted as advising a delegation of western congressmen that he plans to modify immediately orders which handicapped the distribution of Montana gasoline in Washington and Idaho by forbidding the Northwest Pacific dealers to export gasoline into the districts east of the Cascade Mountains, thus leaving their natural territory to the inland refiners.

ILLINOIS

ILLINOIS OPERATORS last week created an organization for the purpose of preparing and following through applications for exceptions to Conservation Order M-68.

W. C. Kneale, of Salem, Ill., superintendent of production for the Texas Co., has been named chairman of a committee of Illinois operators to prepare a list of exceptions to the M-68 drilling order for the Dale pool in Hamilton County.

The exceptions, which will call for drilling two wells in a diagonal pattern on each 40-acre tract, will be presented to the state Division of Oil and Gas Conservation for submission to Petroleum Coordinator Ickes.

Mr. Kneale was appointed at a special meeting of approximately 200 major and independent operators held April 30 at the courthouse in Mount Vernon in response to a call issued by G. C. Curtis, superintendent of the state division.

Samuel F. Peterson, chief state petroleum engineer, estimated "there are probably 30 shallow pools in the Illinois basin for which exceptions can be filed."

"Secretary Ickes' office assured Illinois representatives April 15 at a conference in Washington," Mr. Peterson said, "that exceptions filed for shallow pools will receive favorable consideration. For this reason we feel Illinois operators should reach a common agreement on a course of action."

Numerous operators sharply criticised government restrictions at the session, which was the first state-wide meeting of operators held under auspices of the state division.

Joseph Washington, a member of the OPC staff at Chicago, asked the operators to work for enactment of a practical conservation law in Illinois. "Such a measure would certainly eliminate a great deal of confusion," he said. "I believe politics has been the primary cause for failure of Illinois to enact a good conservation law."

Assistant Director Joseph Marchesi, of the Department of Mines and Minerals, who replied to Mr. Washington, said "Gov. Dwight H. Green has made every effort to sponsor and secure eventual passage of an acceptable conservation program. He cannot control the legislature, but I feel certain that the situation is greatly improved due to the war emergency."

The governor, Mr. Marchesi said, has been holding a series of meetings in recent weeks with legislators representing both political parties in an effort to formulate a program for presentation at a special session of the general assembly.

R. B. Kelly, Illinois manager of the Pure Oil Co., nominated Mr. Kneale for chairman of a group to prepare exceptions for the Dale pool. Other speakers at the session included E. G. Robinson, of Centralia, manager for Shell Oil Co., and Robert C. Jean, assistant superintendent of the state Oil and Gas Conservation Division.

The OIL AND GAS JOURNAL

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The Hardest Hit

Reports from all parts of the country reveal that the disruptions in petroleum operations, due to the war, are working particular hardships on important units of the industry. In some cases they are due to loss of outlets and, in others, to frozen or lower prices in the face of higher costs.

It is true there are companies which so far have been able to maintain earnings at the prewar levels of 1941 or higher. In the case of producing units, profits are aided by reductions in expenditures, a forced result of the restrictions in drilling and in the use of all materials. As one operator has pointed out, these earnings, based on curtailments, are in effect taken from previously established reserves and, later, activities must be expanded in order to maintain operating positions.

At the other extreme is the producer who has seen his field allowables cut 25 or more per cent; the refiner whose plant is operating at a fraction of its capacity, and the pipe-line operator whose lines are not moving as much oil in a week as is normally transported in a day. Then there is the company which has retained its volume but has seen its profits disappear and its assets reduced because prices received for products do not offset increased transportation costs.

The restrictions in operations are the result of the 650,000-bbl. daily decrease in outlets since early December, with the brunt of the contraction absorbed within a few scattered sections. In regard to markets, the drastic reductions in tanker operations are particularly significant because of the increasing importance of transportation in determining comparative price levels.

Large areas, in recent years, have had their prices reduced on petroleum products because of the expansion of crude-oil and product pipe lines, or the extension of inland waterway and ocean-tanker shipments. The war stopped that trend and more and more the industry is dependent on the most costly types of transportation, often ending the previous price relationships between areas and between communities.

If these changes in operations are followed through from the fields to retail distribution it will be found that all operators are either affected now or will be within a few weeks. The Government has granted product-price increases to take care of the outstanding situations brought about by the higher transportation costs. These advances have been helpful to many.

The remedies applied, however, have been general in nature and they have not covered the special conditions of numerous producers, refiners, and marketers. A one-half cent advance in the price of gasoline is not adequate for the operator whose return has been reduced one or more cents per gallon. There have been no price adjustments in the large crude-producing areas.

Outsiders have pointed to the supposedly large profits that will accrue to those who will manufacture aviation gasolines, synthetic rubber, toluene, and other war products. Let there be no delusions as to the returns from these operations. Vital as they are in the war effort, they represent a small part of the petroleum business. These activities are to be largely financed and directed by the Government and the industry's participation is not based on the expectation of profits.

The war agencies and the petroleum industry have a responsibility to aid those who, through no fault of their own, have been hardest hit. What has happened to them can come to others if causes are not eliminated.

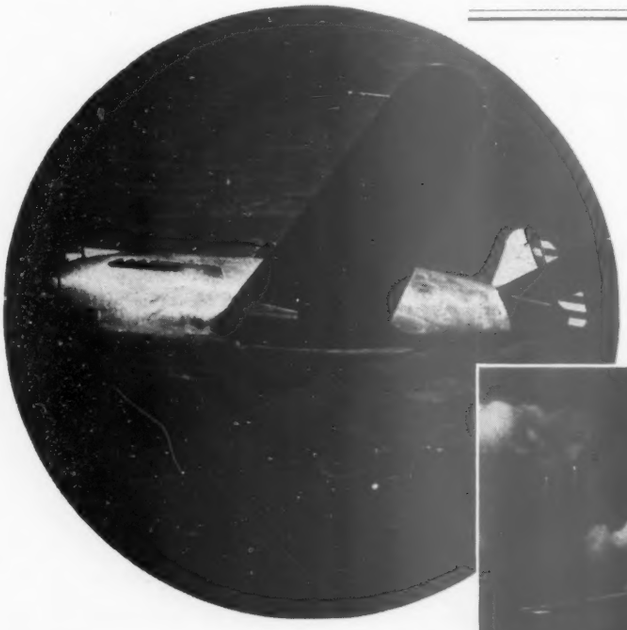
Collectively, these units and others which have been affected adversely to a lesser degree, normally find many oil fields in the course of a year, drill thousands of wells, and supply millions with petroleum products. They are part of the permanent framework of the oil business and are entitled to consideration as such.

War Refinery Investment Is Twice That of Peace Plant

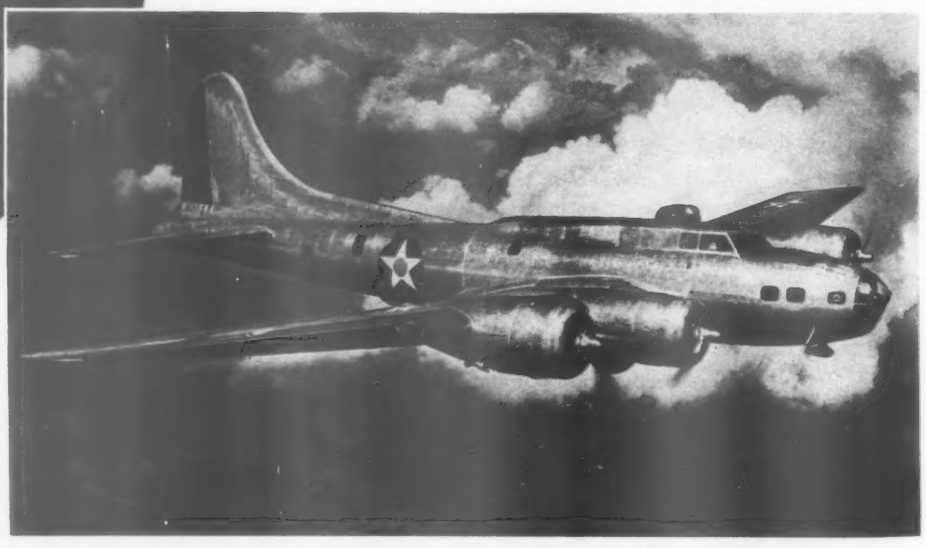
By W. T. ZIEGENHAIN

Under the pressure of war the 451 operating refineries in the United States are forced to make many unusual adjustments. They see a reversal of the demand for more gasoline and less fuel oil, a premium placed upon butane which 2 years ago was hard to dispose of at any price, and a demand for 100-octane aviation gasoline, toluene and butadiene that makes necessary the expenditure of money for new units at a rate six times normal.

THE war is fast driving refiners into either of two camps: one for those who make combat materials and the other for those supplying only the normal civilian demands. To be included in the war group, it is almost necessary to operate a plant of relatively large capacity or to be represented in a centralized group of plants which collectively can contribute to a "war" unit. The investment needed to operate as a war plant is approximately double that of the peacetime refinery of the same crude capacity. A sample production schedule for two refineries of the same crude capacity is shown in the table below, which includes the estimated investment in each.



Left: Unmatched P-40 fighter with unusually heavy fire power. Below: Streamlined B-17E flying fortress capable of defending itself through superior fire power at any angle, and with a heavy-load cruising range greater than any other combat plane. The latter will consume a gallon of gasoline every mile traveled



REPRESENTATIVE DAILY PRODUCTION OF WAR AND PEACE PLANTS

(Data in barrels daily)

	War	Peace
Fuel gases (oil equivalent)	6,000	3,500
100-octane motor-fuel components	5,600	.....
Toluene	400	.....
91-octane motor fuel	5,000	2,500
72-octane motor fuel	10,500	15,000
60-octane motor fuel	4,000	6,000
Tractor fuel	2,500	3,000
Kerosene	2,000	3,000
Burner distillates	1,000	2,000
Light residual fuels	1,000	1,000
Heavy residual fuels	10,000	11,000
Lubricants	1,500	2,500
Wax	500	500
Total barrels	50,000	50,000
Investment	$28,500,000	$14,000,000

These are general statements and it is not difficult to find exceptions, but no one can deny that making and finishing isooctane, toluene, or abnormally high viscosity-index lubricants requires a large plant investment. And maybe, if the refining industry as a whole had not represented such a large investment at the start of the war, the $500,000,000 additional money needed now for equipment in order to make more war materials would attract astounding public attention. This amount is six times that spent for major refinery units in a normal year. On top of this amount, the industry is faced with providing a substantial part of the butadiene and copolymers that will go into the nation's synthetic-rubber program. The additional refinery equipment will cost up to $700,000,000.

This raises the estimated new refinery war expenditures well above the $1,000,000,000 mark. If this is added to the investment already made by refiners in equipment now employed in making aviation fuels, military lubricants and the large amounts spent by chemical manufacturers using refinery gases, the total investment would closely approach $2,000,000,000. As stated previously, some of this investment is in equipment already operating, but the great bulk of it still awaits the conversion of plans into plants.

So far, the industry has stayed well ahead of the military demands for its products and despite changing advance estimates of demand on the part of the military heads. It seems reasonable to expect that the industry will continue to maintain a safe margin of stocks and productive capacity but as the actual demands for 100-octane aviation gasoline tend to rise and the program for training an increasing number of air fighters expands, the construction of additional alkylation plants, isomerization units, catalytic cracking plants, hydroforming units, precision fractionating equipment and refrigerating equipment causes the job to look tougher.

Built for Peace Time

Because the refining industry was designed to satisfy the growing needs of a peaceful nation and showed the ability to revise its operations to conform to changing demands, it early felt sure that it could assume the added job of supplying this country's needs for military oil supplies. When the war was confined to Europe and while this country was bending every effort to avoid self-involvement, the refining industry expected a call only to supply defense commodities. It held plans to do this by simply expanding the operations of some of the larger refineries and by adding relatively little special equipment. Then came the lend-lease arrangement, followed by Pearl Harbor. What was assumed to be a minor job grew into the primary one, namely, that of supplying fuels that would win the war.

The estimated needs for 100-octane aviation gasoline grew from 40,000 bbl. daily to 80,000, then 120,000 and now 250,000 bbl. The estimated demand for toluene increased with each new government ordnance-works-construction authorization. As the production schedules of fighter planes were stepped up, the schedules for training the fliers were also increased so the anticipated demand for 91-octane aviation gasoline was also raised repeatedly.

Less Civilian Driving

In the face of increasing aviation-gasoline-production needs refiners saw their civilian gasoline demands slide away. Through January, February and March, the lesser civilian driving became apparent throughout the Middle West and in April the curtailment was felt in practically all sections. In the East, where industrial activities called for use of the family car to get men to and from their jobs, the change was less noticeable and was delayed because of the increasing industrial activities. Now the declining civilian demands are accounted for in part by curtailed deliveries of gasoline from Gulf ports to eastern ports rather than a diminished desire to drive. Also, the tire pinch is beginning to be felt more severely in the East where earlier in the year an attitude of "We'll get tires somehow" was in evidence.

There appears to be a growing realization that within 2 years, half of the 28,000,000 passenger cars in service at the beginning of the year will be out of service unless new or recapped tires are supplied in the meantime. Publicity of this prospect has become general throughout the East and is based upon data that the rate of removing passenger cars from service will increase throughout 1942, 1943 and 1944 unless an unforseen supply of rubber substitutes comes into use.

All of this suggests the seriousness of the refiners' problem of supplying butadiene and other hydrocarbons to rubber-compounding plants for the earliest production of synthetic tires. Several butadiene plants have been tentatively located among important refinery centers, namely near Chicago, Ill., Beaumont and Borger, Tex., and Los Angeles. Others will probably follow and will jointly supply the base products for the compounding of synthetic rubber in plants located within these areas or in Akron, Ohio, Providence, R. I., and additional scattered points when they are chosen.

Unnatural Development

Thus, the refiners assumed responsibility to supply aviation gasolines and rubber substitutes in the face of a declining civilian demand for motor fuel, which brings the industry into a direct conflict with its normal development. Added to the confusion is the call for refiners to make more residuum fuels to supply war industries in the East. Obviously, this is a reversal of the normal practice of converting heavy fuels to motor gasoline by cracking. The immediate fuel needs of these eastern war industries were supplied from storage, by convoyed tankers from the Gulf Coast and by rail and barge from the interior refineries, but a sustained demand for heavy fuels which is fast growing out of proportion to gasoline consumption will greatly disrupt the normal refinery practices.

These factors plus other confusing demands are causing refiners to reevaluate their relative positions in the industrial world. Since each refiner is dominated by the desire to further the nation's warfare he does not want to spend a large amount of money for equipment he can not permanently use and least of all, is he willing to shut down his plant. The OPC in Washington clearly recognizes this complex problem. Various plans to consolidate refinery operations have been suggested to OPC. One suggests that the larger plants refine the crude now going to smaller units in a given area. Along the Gulf Coast where such a plan might serve the nation best, objections came from all sides when it was suggested. An alternate plan suggested there called for fixing an estimated monthly demand for refinery products. This was to be issued through the OPC for the entire Gulf Coast area. The same office would then determine what crude runs should be maintained to supply the aviation gasolines, war lubricants, toluene, etc., to be delivered and then to show preference to the war plants in allocating the runs for that month. In this manner the production of war supplies would be most assuredly maintained. The balance of the crude to be run would be equitably distributed among the plants which claimed no war-products commitments.

Still another plan suggested a closer control over shipments of crude and products in and out of the Gulf Coast area, in which case the local civilian demands would be filled more completely by local refiners and thereby sustain a stronger local refining industry among the smaller, scattered plants. Here, concern for the welfare of the smaller plant was in evidence.

Still another plan suggests running all refineries at near capacity to recover the fuel oil and cracked gases and after adjusting gasoline production to a minimum, run the excess gasoline production back into the crude-oil producing formations where it may later be recovered from the crude.

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Districts 2 and 3 Refiners Asked to Change Operations

MID-CONTINENT and southwestern refiners this week studied recommendations received from the Office of Petroleum Coordinator calling for a reduction of 20 per cent in the gasoline production from District 2 operations and a 30 per cent cut in crude runs in District 3.

"Because of the critical situation regarding the stocks of residual fuel oil," Deputy Coordinator Ralph K. Davies wired District 2 refiners, "we call upon you to adjust your refinery operations to increase immediately your production of the residual fuel oils by reducing your gasoline production to a percentage yield on crude not to exceed 80 per cent of your motor gasoline percentage yield per barrel of crude in the year 1941."

District 2 refiners produced 197,798,000 bbl. of gasoline in 1941 in processing 378,387,000 bbl. of crude, an average recovery of 52.2 per cent, as shown in the accompanying table. The recommendation of Mr. Davies would reduce the production of motor fuel, assuming crude runs remained constant at the 1941 level, to 158,238 bbl., a change in operations that would lower gasoline recovery to 41.7 per cent of crude charged.

District 3 refineries were asked to reduce daily average runs of crude to not more than 70.5 per cent of the rate prevailing during the last 6 months of 1941. Crude runs to refineries in District 3, exclusive of New Mexico, averaged 1,417,000 bbl. daily during the last 6 months of 1941. The OPC recommendation would lower throughput of refineries in the four regions contained in District 3 to approximately 1,034,000 bbl. daily. The recommended rate of operations in District 3 is equivalent to the daily average crude runs through Gulf Coast plants during the last half of 1941.

Recommendations to both groups of refiners specifically exempt plants engaged in producing war materials and request that such operations be continued at maximum efficiency.

DISTRICT 3 OPERATIONS

(Thousands of barrels)

	Crude-oil runs to stills			
1941—	Texas Inland	Texas Gulf	La. Gulf	Ark.-La. Inland
July	5,671	30,376	4,934	2,661
August	5,910	31,421	4,899	2,670
September	5,742	30,883	4,861	2,694
October	5,948	32,000	4,849	2,726
November	5,506	31,881	4,822	2,477
December	5,761	33,674	4,905	2,613
Six months' total	34,538	190,235	29,270	15,841
Daily average	188	1,034	159	86
At 70.5% of 1941 average	133	729	112	61

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"War" Substituted for "Defense" In Coordinator's Title

WASHINGTON, D. C.—The Office of Petroleum Coordinator for War is the new name authorized by President Roosevelt for the federal oil agency under the direction of Harold L. Ickes, secretary of the interior.

Abolished is the original name—Office of Petroleum Coordinator for National Defense.

The change, Coordinator Ickes announced last week, was approved as "more appropriate to the situation existing today."

DISTRICT 2 OPERATIONS

(Thousands of barrels)

	Gasoline production		Percentage on crude		Crude runs to stills	
1941	Indiana, Illinois, etc.	Okla., Kans., and Mo.	Indiana, Illinois, etc.	Okla., Kans., and Mo.	Indiana, Illinois, etc.	Okla., Kans., and Mo.
January	9,879	4,855	51.9	49.6	19,045	9,786
February	9,005	4,676	50.4	51.1	17,884	9,148
March	10,030	5,417	50.7	53.0	19,763	10,214
April	9,609	5,115	50.8	51.4	18,907	9,950
May	11,180	5,646	51.1	53.0	21,883	10,649
June	11,175	5,509	52.7	50.9	21,225	10,831
July	11,635	5,782	52.7	51.2	22,079	11,296
August	11,320	6,022	52.0	53.2	21,759	11,321
September	11,896	5,882	53.9	52.9	22,076	11,116
October	12,184	6,131	53.5	53.7	22,764	11,411
November	11,578	5,778	53.1	54.0	21,794	10,697
December	11,619	5,875	52.6	54.9	22,078	10,711
Total	131,110	66,688	52.1	52.4	251,257	127,130
Result of 20% gasoline cut	104,888	53,350	41.7	41.9	251,257	127,130

Ickes Explains to Committee Why Rationing Is Necessary

WASHINGTON, D. C.—The OPC hopes to develop additional overland transportation to supply all petroleum needs of the Atlantic Coast area independent of tanker movements during the war, but a large deficit will exist for many months, justifying rationing, Petroleum Coordinator Harold L. Ickes told the House petroleum subcommittee Monday.

At the request of the committee he submitted a progress report on work of OPC during the past 3 months. Representative Lea of California, acting as chairman due to illness of Representative Cole of Maryland, said the purpose of the hearing was to inform the House of conditions, and while the public is disposed to accept any gasoline rationing required by the war it needed a clearer understanding of the situation. The committee will hear Leon Henderson on details of the rationing plan on Friday.

Mr. Ickes reviewed efforts to increase rail movement of oil, hinted that new plans for greater utilization of rail and barge facilities are under study, suggested that further increases in price will be necessary to compensate for freight costs, and outlined in general terms a plan for shifting refinery runs from gasoline to fuel oil with compensatory price adjustments.

Crude Inventories Lower

In his prepared statement he said, in part:

"As of February 4, inventories of crude oil and petroleum products were 7,521,000 bbl. below what they had been a year before.

"On April 11, the last date on which figures were made public, these inventories had declined to 15,218,000 bbl. below what they had been 1 year before.

"Thanks to the perfectly amazing achievements of the oil companies and the railroads, approximately 600,000 bbl. of oil daily moved by tank car into the East Coast during the week ended April 18. An additional 175,000 bbl. is moved to the East Coast by other overland or safe water transportation. Thus, there is a daily supply of nearly 800,000 bbl. of petroleum or petroleum products which can be transported overland or by safe water routes to the Atlantic seaboard.

"Against this supply, it is estimated that we face a demand—after allowing for present restrictions on gasoline and fuel-oil consumption—of approximately 1,200,000 bbl. daily.

"This means that we are still 400,000 bbl. per day short of our goal, which is to build up these substitute facilities to the point where we can, if necessary, be entirely independent of ocean transportation for the duration of the war.

"Nor are we stopping with tank cars. We are, as rapidly as possible, utilizing all methods of transportation to the fullest possible degree. Transport trucks have already been put to use to an unprecedented degree on short hauls to take the place of tank cars. The Petroleum Industry War Council, at the suggestion of my office, has worked out a far-reaching program of pipeline development which involves among other things, the digging up and relocating of more than 1,400 miles of second-hand pipe. Engineers have virtually completed their blueprints of these plans, and will be ready, within a few days, to start actual work in the field on certain of the projects. At the same time, a comprehensive barge program is under way—a program which, it is hoped, will more than double the shipments over our inland waterways.

"Even with all of these steps, it would still be necessary to rely on ocean shipments if the East were to be supplied with enough oil to meet normal demand. No one has the right to ask seamen to risk their lives in order to preserve motoring as usual. If necessary, nonessential motoring, boating and cycling must be cut right through the bone into the very marrow. We did not recommend the present 33⅓ per cent curtailment because we wanted to do so. If we find it necessary to call for a still deeper cut, it will not be because we want to do so. We recognize that the automobile has become an important factor in our daily lives, and that any restriction on its use causes inconvenience and even hardship, not only to motorists but to the dealers in petroleum products. In recognition of all of these things, however, we can never for one moment forget that everyone's first duty is to do whatsoever things are necessary in the face of the fact that we are at war.

"It has always been the hope of the Office of Petroleum Coordinator that petroleum supplies in all areas of the nation might be maintained at a high level, taking into account war needs. Our efforts have been constantly directed to that end. The willingness of the oil industry to cooperate in that effort by spending vast sums of money out of pocket for the costly overland movement has been one of the most praiseworthy examples of government-industry teamwork that I have ever witnessed. For example, in order to enable essential industries to keep running, these companies have bought heavy oil in Texas for 85 cents per barrel, paid $1.65 to ship it, and sold it for $1.80 per barrel; a loss of 70 cents per barrel.

Increased Insurance Rates

"Another formidable addition to the oil companies' costs has arisen from the tremendous increase in insurance rates for the shipments still being made by tanker.

"I am glad to say that the Office of Price Administration has granted increases in the prices of petroleum products which will partially compensate for the additional cost of overland movement. We expect to support a plea for still further increases to care for the ever-increasing volume of rail shipments. We believe, also, that the war-risk insurance on tankers should be paid out of the public Treasury, as provided for by H.R. 6554, recently signed by the president.

"Even these compensatory measures, however, will not balance off the additional costs which the oil companies have assumed in order to fill our greatest petroleum need on the East Coast—and in other areas, too: heavy industrial oil.

"It has become increasingly obvious that among other upside-down values in a war economy, the petroleum-refining industry must be adjusted to a situation where fuel oils become more and more essential to our war requirements, while motor gasoline becomes less important. This shift from normal operations calls for a major technological revolution.

"Our current problem is to shift the economic base of a gigantic refining industry, to do it in weeks instead of years, and to do it in a period when, because of price control, a free market has ceased to exist. In cooperation with the Office of Price Administration and the industry advisory committees, we are attempting to devise a method which will accomplish these things:

"1. Increase the yields of fuel and heating oils, while decreasing the yield of gasoline. This is a major technological revolution.

"2. Make the refiner want to cooperate in doing this.

"3. Avoid inflationary price increases.

"4. Retain the individual initiative of each refiner. Give him the incentive to keep his costs low and his plant operating efficiently.

"5. Avoid having an army of government inspectors and policemen checking each plant to see that nobody is chiseling.

"6. Treat everyone as fairly and equitably as possible.

Must Accomplish Objectives

"We cannot solve our East Coast supply situation permanently unless we accomplish these objectives. Our method is not yet completed but I am confident that it will be worked out in the near future. Of course, it involves price changes and will shift the costs among the various groups of consumers of petroleum products. But the overall gross revenue to the refiners and the total cost of all petroleum products to the consuming public will remain substantially the same.

"When you realize that, merely as intermediate stages in solving our problem, we are revolutionizing the transportation and refining sections of the entire petroleum industry, you get an idea of what we have to accomplish. We can accomplish it and we will, but I am frank to say that it will only be because of the way the petroleum industry has organized itself for cooperative action with the Government. I am proud of the structure and organization through which my office and the industry coordinate their cooperative efforts to win this war. It is, in fact, 'democracy in action.'

"The matter of price is a major factor in determining whether we shall or shall not be able to conquer our present supply difficulties. I am confident that Mr. Henderson's office will give us sympathetic assistance in this phase, so that we may prosecute a continuing attack upon both problems."

In answer to questions, Mr. Ickes told the committee there is still need for the National Defense Pipe Line and that while plans are under way to move more oil by Atlantic Coast Inland Waterway, wood and concrete barges offer slight hope and the steel shortage will prevent construction of many barges and towboats.

Answering a complaint of the Pittsburgh Chamber of Commerce of excess gasoline in western Pennsylvania, Mr. Ickes said price and quality of that gasoline have prevented its shipment, but arrangements are being made to have eastern distributors move it and that the Pittsburgh region may be taken out of the rationing area. He said he does not favor nation-wide rationing where transportation facilities do not require it, but if it becomes the national policy to save tires by gasoline rationing the OPC will cooperate.

Mr. Lea raised the question of government subsidies as compensation for wartime costs, and he and Mr. Ickes agreed this is not desirable except on ocean insurance. Mr. Ickes said oil companies in the East are now selling gasoline at a loss on their over-all costs but OPA price increases compensate them for increased freight charges, though these costs keep increasing and the companies cannot bear them indefinitely and they must have profits to stimulate them to do their best in moving more oil.

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Texas Unwilling to Accept OPC Quota Without Investigation

AUSTIN, Tex.—Texas producers this week continued their operations at the April rate under terms of a temporary 10-day proration order issued by the Railroad Commission. Meanwhile, the commission continued efforts to obtain reconsideration of Texas' May production quota of 960,000 bbl. daily certified by the Office of Petroleum Coordinator. An exchange of telegrams last week between Jerry Sadler, member of the Railroad Commission and Coordinator Ickes resulted in no final understanding. Coordinator Ickes twice rejected pleas for modification of the May order which cut Texas production about 200,000 bbl. daily.

Temporary nature of the 10-day order, however, indicated that Texas' oil regulatory officials were unwilling to accept the reduced quota without first pursuing negotiations for modification. Four producing days for a majority of Texas fields were specified in 10 covered by the temporary order. Fields producing crude essential to the manufacture of aviation gasoline, materials and explosives will produce during 7 days of the temporary proration period.

Under the production quota of 960,000 bbl. daily, Mr. Sadler estimated that fields, excepting those yielding essential types of crude, would be permitted to produce only 5 days during May compared to 12 in April. Commissioner Olin Culberson joined Mr. Sadler in declining to accept without question the OPC quota. Ernest O. Thompson, chairman, declared that the short-term order would demonstrate whether 960,000 bbl. per day, or more, could be moved. Mr. Culberson referred to 49,000,000 bbl. of empty refinery storage in Texas and declared that he was not convinced that the situation "justifies the assassination of the little man."

Suggests Recycling Curb

In a telegram reaffirming the quota of 960,000 bbl. daily for Texas this month, Coordinator Ickes suggested that part of the reduction be applied to condensate fields and cycling plants and dismissed reference to empty storage by saying it was required for operating margin.

The coordinator wired the commission: "We have carefully reviewed the entire problem relating to recommended production rate for Texas during May. This office has been and is now exerting every effort to alleviate the serious transportation situation which has so drastically affected every phase of petroleum operations in all southwestern states. There is no evidence to indicate that the situation can be expected to improve substantially in the immediate future. In fact no assurance exists that the volume of petroleum and petroleum products equivalent to the recommended production rate of 960,000 bbl. daily which I have certified to you for Texas during May can be moved or marketed. Stocks of crude and products in Texas are already considerably in excess of the stock position of other areas of the United States, even when considered on a relative basis.

"While substantial additional storage capacity exists, much of this capacity is employed as working storage and must be reserved as such to provide necessary flexibility in pipe line and refining operations. It cannot be filled for long term storage without disrupting and clogging all phases of operations. We recognize that the serious reductions in production necessary to provide reasonable semblence of balance to operations and to continue maximum production of war products will impose hardships on many operators. War brings nothing but hardships and its successful prosecution will require continued sacrifices.

"Because producers of condensate fields and operators of cycling plants have not up to this time been required to limit their production, we recommend that a portion of the burden of curtailment be placed upon such operators, particularly in those instances where the operators do not provide for the most efficient recovery and utilization of the reservoir contents.

Anxious to Raise Texas

"Because such large portion of oil reserves and refining facilities of the nation exist in Texas we are as anxious as you that Texas assume its proper place in supplying petroleum requirements. However, continued production of crude petroleum in amounts greatly in excess of current requirements or of what can be moved to markets and resulting excessive accumulation of stocks would lead directly to physical waste, would destroy the flexibility of operation which necessarily must exist, would also bring unnecessary added distress to all operators, and would work in direct opposition to best interests of war program.

"I therefore urge that you and all operators adhere to recommended production rate for Texas during May that has been certified to you and that you so allocate such production as to provide maximum production of war products and maximum utilization of all transportation facilities available to move crude and necessary products out of Texas to war industry centers in North and East."

Commissioner Sadler, in reply, said he "would be derelict in duty to my conscience if as one member of the Railroad Commission of Texas I followed your recommendation."

Inland Texas refineries with capacity of 260,000 bbl. per day would be forced to suspend operations if the quota of 960,000 bbl. daily is followed, Mr. Sadler said.

"In my opinion," he continued, "it is unsound practice to curtail the production to the extent that major interests cannot supply the little man."

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Ickes Denies Kansas' Plea For Higher May Rate

WASHINGTON, D. C. — Transportation facilities and storage levels are the primary considerations at present in determining production rates, Coordinator Ickes declared in refusing to increase the recommended May production rate for Kansas. In a telegram to Gov. Payne H. Ratner, he said:

"Have given careful consideration to Kansas' request for 50,000-bbl. daily increase in production during May over rate for April.

"Certified rate recently issued for May provides increase of 5,900 bbl. daily. Additional production beyond this increase not justified considering stock position of Kansas crude which has remained substantially in balance for many months past. Experience has often demonstrated that mere nominations for purchases or movements do not reliably reflect actual demand and that best evidence of actual change in demand is change in level of stocks. During this time of serious transportation shortage we recognize that best interests of war program demand that all pipe-line facilities moving petroleum from producing areas of Southwest and Mid-Continent to war-industry centers of North and East must be utilized to capacity and that sufficient petroleum must be produced in proper areas to accomplish this result, regardless of other important considerations such as relative operating efficiencies of various producing areas and fields which under normal circumstances should receive greater attention in determining production rates. Our information indicates that recommended-production rate for Kansas during May and current stocks of Kansas crude are sufficient to permit movement of petroleum to utilize any additional unused pipe-line capacity to North and East that may exist. It is incumbent upon industry to see that any such capacity is fully utilized, even though this may require some temporary draft on stocks, and thus demonstrate that demand actually exists and that oil actually can be moved.

"Except in case of necessary drastic change in operations, which at some time might be required, this office must adhere to policy of recognizing only demonstrations of demand and movement rather than nominations. I therefore urge that Kansas conform with recommended production rate of 259,300 bbl. daily as already certified."

Governor Ratner had requested an increase in the Kansas allowable based on nominations considerably higher than the OPC quota. Appeal was based on the claim that Kansas could produce 50,000 bbl. per day more without harming fields.

OPC Prohibits Abandonment of Profitable Oil or Gas Wells

WASHINGTON, D. C.—Judgment of the Office of Petroleum Coordinator last week became a factor in determining when an oil or gas well has reached the end of reasonably expected recovery.

In Recommendation 47, the OPC prohibited the abandonment of any well until it is incapable of producing enough to pay costs of labor, maintenance or repair and taxes, except when the production of water from a well tends to diminish the ultimate recovery of petroleum from a reservoir.

"It is essential to the success of the war effort that the maximum recovery of known reserves be obtained," Deputy Coordinator Ralph K. Davies said, in explaining the order.

Except when abandonment is permitted under the recommendation, casing or equipment shall not be salvaged from a well if such action will result in the isolation and loss of the remaining reserves in a reservoir. When wells are abandoned in accordance with state and OPC requirements, prompt use must be made of material and equipment salvaged from the discontinued operation.

Notice of intent to abandon a well capable of producing more than 1 bbl. of crude oil or 6,000 cu. ft. of natural gas daily should be filed with the district director of production at least 30 days before abandonment operations are scheduled to begin. The notice must be filed in the district in which the well is located and on an OPC form provided by the district office. If no disapproval notice is received from OPC by the operator, he may proceed with abandonment operations.

A well actually incapable of production because of depletion of a reservoir or because of failure to find oil in commercial quantities may be abandoned, provided that the operator conforms with state regulations. Where there is no state regulatory authority, abandonment procedures must be in accordance with recognized engineering principles.

Specific Tank-Wagon Prices Applied in 21 Western Cities

WASHINGTON, D. C.—Conviction that some of the tank-wagon quotations established as standard in Revised Schedule 88 were erroneous and not representative of the actual business transacted between October 1 and 6, 1941, precipitated a more definite ceiling of prices last week in certain midwestern and western states.

The Office of Price Administration issued Amendment 9 to the basic petroleum-price order and made its specific market findings applicable April 29 in a few cities in Iowa, Ohio, Wisconsin, Arkansas, New Mexico, North Dakota, Montana, Oklahoma and Wyoming.

Evidence and affidavits submitted to the OPA by principal marketers in the areas affected indicated that prices actually charged at those points were not those published.

The table of specific prices found to exist at the time ceilings were imposed by Revised Price Schedule 88 appear in the following tables:

MAXIMUM TANK-WAGON PRICES, EXCLUDING TAXES

(In cents per gallon)
D—Dealer. C—Consumer or commercial.

	Third gr.		Regular		Premium	
Tank-wagon area:	D	C	D	C	D	C
Iowa:						
Des Moines	9.4	10.4	9.9	11.4	11.4	13.4
Ohio:						
Geneva	9.5	12.0	9.5	12.0	11.0	14.0
Wisconsin:						
Lodi	10.1	11.1	10.6	12.1	12.1	14.1
Madison	9.9	10.9	10.4	11.9	11.9	13.9
Mazomanie	9.9	10.9	10.4	11.9	11.9	13.9
Sauk City	10.1	11.1	10.6	12.1	12.1	14.1
Stoughton	9.9	10.9	10.4	11.9	11.9	13.9
Sun Prairie	10.1	11.1	10.6	12.1	12.1	14.1
Arkansas:						
Fort Smith	6.25	6.25	9.0	9.0	...	...
Little Rock	7.0	7.0	9.5	9.5	...	...
Texarkana	7.5	7.5	9.0	9.0	...	...
New Mexico:						
Roswell	9.0	9.0	10.0	10.0	...	...
North Dakota:						
Fargo	...	...	11.4	...	...	...
Montana:						
Billings	11.0	11.0	12.0	12.0	...	...
Butte	10.5	10.5	11.5	11.5	...	...
Great Falls	11.0	11.0	12.0	12.0	...	...
Helena	11.0	11.0	12.0	12.0	...	...
Oklahoma:						
Muskogee	6.75	6.75	7.75	7.75	...	...
Oklahoma City	7.0	7.0	8.0	8.0	...	...
Tulsa	7.0	7.0	8.0	8.0	...	...
Wyoming:						
Cheyenne	9.0	9.0	10.0	10.0	...	...

Maximum Tank-Wagon Prices for Kerosene

Tank-wagon area	Cents per gal.
Cheyenne, Wyo.	9
Roswell, N. M.	7
Fort Smith, Ark.	8
Texarkana, Ark.	7

Mark S. Patton Joins OPC's Natural Gas-Gasoline Branch

Mark S. Patton, Tulsa, president of the Hurley Gasoline Sales Co., has been appointed assistant director of the Natural Gas and Natural Gasoline Division of the Office of Petroleum Coordinator and will report for duty in Washington later this month.

A. Krupnick photo
MARK S. PATTON

Most of Mr. Patton's 30 years' experience in the oil industry have been spent in the Mid-Continent district.

Mr. Patton is now in Chicago conferring with Wirt Franklin, director of production in charge of OPC's District 2 office. He will return to Tulsa for the annual meeting of the Natural Gasoline Association of America May 14-15, and expects to report to Washington during the following week.

Truck Association Reports Big Increase in Oil Handling

WASHINGTON, D. C.—Clearly indicating that tank trucks have been pressed into service to help fill the breach in petroleum transportation facilities caused by ship sinkings, the volume of oil handled by motor carriers in March skyrocketed almost 80 per cent above the same month last year, according to reports compiled and released April 27 by the American Trucking Associations.

Transporters of petroleum products, accounting for a little more than 9 per cent of the total tonnage reported, showed an increase of 18 per cent over February, and an increase of 78.1 per cent over March 1941.

Truck movement of petroleum reported to A.T.A. does not include volume transported by oil-company-owned fleets which are being used at efficiency rates probably exceeding independent carriers. Movements are under way to virtually pool all truck transport facilities in order to eliminate expensive and useless trips with tanks empty.

Revised Code Covering Public Lands Limits Assignments

DENVER, Colo.—An amendment to the General Land Office code of federal regulations (Circular 1453 approved November 18, 1938) limiting overriding royalties on oil and gas leases on the public domain to 5 per cent, approved by Harold L. Ickes, secretary of the interior, on March 9, will have far-reaching effects in the Rocky Mountain area. The code provides that the lessee agree not to assign by lease, by operating agreement, or by working or royalty interests his rights except by the consent of the secretary of the interior. The new amendment sets up a definite policy in regard to approval of assignments in the following language: "No assignment of any kind will be recognized as valid which, exclusive of royalty payable to the United States, shall create an overriding royalty interest in the lease in excess of 5 per cent."

Under the old permit laws a person obtaining a permit on 2,560 acres was allowed upon making a discovery to choose one-fourth of the acreage within the permit and obtain a preferential lease at a royalty of 5 per cent on same. An overriding royalty of 7.5 per cent on the preferential lease generally was the rule. In some instances the working interest, operating agreement, or royalty interest went far above that figure. The excess over 5 per cent above the government royalty now is definitely out when the lease comes up for renewal. For example, certain leases carrying a 33 per cent interest in an unnamed Wyoming field have now expired under the 20-year limit. These cannot be renewed except by the approval of the Interior Department and approval will not be given when they provide for more than the 5 per cent. The ruling also applies to new leases. It does not apply to unitized areas, such as Salt Creek, where leases in perpetuity have been approved.

Refinery Plastic May Replace Tin in Can

The Shell Chemical Co., a subsidiary of the Shell Oil Co., Inc., is experimenting in the advanced stages with a refinery-derived plastic that will withstand relatively high degrees of heat which may be molded into the shape of cans to serve as containers for foods.

Because foods must be heated in the containers and then sealed to preserve them, the ability of the plastic to resist heating is an important factor. Earlier when plastics were suggested for this service, all failed in the heat test or were too costly.

If the practice of using this material becomes general, the refining industry will add another important commodity to its long list of war specialties and will serve another important function in supplying substitutes for tin and other commodities withheld from world trade by the war.

For those who are technically minded the term di-allyl-phthalate may be referred to as the petroleum derivative. Its base is an allyl alcohol.

Natural Gasoline

Postwar Aspects of Technical Developments Now Under Way to Feature N.G.A.A. Meeting

The address of William B. Stout, Detroit, Mich., engineer, at the banquet Friday evening will highlight the annual meeting of the Natural Gasoline Association of America in Tulsa May 14-15.

Mr. Stout, former president of the Society of Automotive Engineers and widely known for his design of the first commercial multiengined airplane and more recently the rear-engine automobile, will discuss some of the postwar aspects of technological developments now under way.

Five technical discussions of interest to natural-gasoline manufacturers are on the Thursday afternoon program. Two speakers from the Office of Petroleum Coordinator's staff will talk Friday afternoon.

The program:

Thursday Morning, May 14

Registration
Technical Committee Meetings

AFTERNOON

Report of Gas Testing Committee — H. L. Oder, Cities Service Oil Co., chairman.
Report of Technical Committee — H. H. Beeson, Sabine Valley Gasoline Co., Inc., chairman.
The Density of the L.P.G. Hydrocarbons, Their Mixtures, and Three Natural Gasolines—B. R. Carney, Shell Oil Co., Inc.
Elimination of Errors in Fractional Distillation of Gases—H. A. Montgomery, Hanlon-Buchanan, Inc.
The Testing of High Pressure Gases — C. H. Gee, La Gloria Corp.

EVENING

General Mixer and Buffet Dinner

Friday Morning, May 15

The Extraction of Butane—J. W. Wilson, Cities Service Oil Co.
A Suggested Standard Method for the Measurement of High Pressure Gases—Dr. Donald L. Katz, University of Michigan.

AFTERNOON

The Tank Car Situation With Specific Reference to the Natural Gasoline Industry—C. R. Musgrave, vice president Phillips Petroleum Co., chairman District 2 subcommittee on tank cars and trucks, OPC.
Address—D. E. Buchanan, petroleum coordinator's staff Natural Gas-Natural Gasoline Section, Washington, D. C.
Address—Justine Wolfe, attorney, Natural Gas-Natural Gasoline Section, OPC., Washington, D. C.

EVENING

Banquet celebrating the twenty-first anniversary of the association.
President's Address—Ray E. Miller, vice president Hanlan-Buchanan, Inc.
Presentation of the Hanlon Award.
Address—William B. Stout, president of Stout Engineering Laboratories, Inc., Detroit, Mich.

Interpretation Issued on Liquefied-Gas Order

WASHINGTON, D. C.—An exemption paragraph in Limitation Order L-86, governing the installation of liquefied-petroleum-gas equipment, was clarified last week in an official interpretation issued by the director of industry operations.

The paragraph in question exempts from the terms of the order equipment "installed and in actual use prior to April 1, 1942 . . . subsequently withdrawn from such use." The interpretation makes it clear that only equipment withdrawn after April 1, 1942, is exempt.

Following is the official interpretation:

Subparagraph (d) (3) of General Limitation Order L-86 reads as follows:

"(3) to any case where liquefied-petroleum-gas equipment is to be installed which liquefied-petroleum-gas equipment was installed and in actual use prior to April 1, 1942, and which liquefied-petroleum gas equipment was subsequently withdrawn from such use."

The phrase "subsequently withdrawn from such use" in this subparagraph refers to withdrawal subsequent to April 1, 1942, and only equipment installed and in actual use prior to April 1, 1942, and withdrawn subsequent to that date, may come within the exception in this subparagraph.

Recycling News

Texas Commission Approves Sheridan Field Project

HOUSTON, Tex.—Permission to operate a plant for recovery of distillate and for recycling residue gas to the producing formation in the Sheridan field of Colorado County, Texas, has been granted to Shell Oil Co., Inc.

The special Railroad Commission order grants the company permission to produce not more than 25 per cent of the daily open-flow potential, to process all gas for gasoline recovery and to return the residue to the horizon from which it was produced.

Natural Gas

Panhandle Eastern and Subsidiaries File Under 7(c)

WASHINGTON, D. C. — Joint application has been filed with the Federal Power Commission under Section 7(c) of the Natural Gas Act by Panhandle Eastern Pipe Line Co. and its subsidiaries, Illinois Natural Gas Co. and Michigan Gas Transmission Corp., for a certificate of convenience and necessity covering applicants' integrated natural-gas system.

The integrated system which, according to the application, totals more than 1,200 miles, is described as follows:

Panhandle Eastern Pipe Line Co.: Gas produced or purchased in the Panhandle field of Texas and augmented by deliveries from the Hugoton in southern Kansas, is transported through the main high-pressure line which extends approximately 857 miles from the vicinity of Stinnett, Tex., to Dana, Ind. In addition, Panhandle Eastern operates some 340 miles of lateral or branch lines in Texas, Kansas, and Missouri, as well as two lines in Indiana and Ohio which tap off of the Michigan company's main line, and an isolated service area in Kansas and Missouri south of Kansas City. The application also requests that the certificate cover a group of lines either under construction or contemplated, totaling some 390 miles, in Michigan. This system would receive its gas supplies on a redelivery basis from the Michigan company.

Illinois Natural Gas Co.: This company's lines, which are located wholly within Illinois, are described as a group of lateral lines which transport gas from various points of connection with Panhandle Eastern's main high-pressure line to numerous communities, most of which lie to the north of the Panhandle Eastern line.

Michigan Gas Transmission Corp.: From a point near Dana, Ind., the Michigan company's lines form, in effect, an extension of the Panhandle Eastern high-pressure transmission line. At Zionsville, Ind., two pipe lines diverge, one extending to the vicinity of Detroit, Mich., and the other to Muncie, Ind., at which point gas is redelivered to the Panhandle Eastern company to supply its eastern Indiana and Western Ohio lines. These two main lines traverse a total distance of about 360 miles in Indiana, Ohio, and Michigan.

The application adds that main-line industrial customers purchase over 25,000,000 cu. ft. of gas per year at each of 18 delivery points in Kansas and Missouri, and that a portion of the requirements of Kentucky Natural Gas Corp. are supplied by Panhandle Eastern.

FPC Orders Investigation Of El Paso Gas Co. Rates

WASHINGTON, D. C.—The Federal Power Commission has authorized an investigation to determine if El Paso Natural Gas Co., Western Gas Co. and El Paso Gas Transportation Corp. are natural-gas companies within the meaning of the Natural Gas Act and whether the rates, charges, practices or contracts of those companies which may be subject to the jurisdiction of the commission are unjust, unreasonable or discriminatory.

Natural Gas Pipeline Co. Reduces Rate to 10 Outlets

WASHINGTON, D. C.—The Federal Power Commission last week announced approval of new wholesale-rate schedules for gas sold by the Natural Gas Pipeline Co. of America to 10 utility customers which result in reduction of approximately $3,770,000 a year in its charges. The new schedules, which the commission found to be in compliance with its rate-reduction order affirmed by the Supreme Court in March, are applicable to bills regularly rendered on and after September 1, 1940, and will result in a refund of $6,283,149.86, representing excess charges collected by the company during the period September 1, 1940, through March 1942, from wholesale purchasers of natural gas.

Two Repressuring Projects In Arkansas to Be Reviewed

EL DORADO, Ark.—Two repressuring projects in the Smackover field will be discussed at the Arkansas Oil and Gas Commission hearing here May 27. Both projects are in the Louann area. The latest of these repressuring attempts is just getting under way through joint arrangement of Gulf Refining Co. and the Texas Co., 1½ miles west of Smackover, Ark.

Details of the repressuring projects, as well as the possible reduction of oil-field vacuum, will be discussed at the hearing.

Henderson Acts to Lighten Cost of Oil Transportation

OIL companies absorbed extra transportation costs totaling $12,000,000 in March and an estimated $14,000,000 in April. These costs were the chief factors in influencing Leon Henderson, price administrator, in modifying ceilings last week.

The prepared statement by Mr. Henderson said:

In the issuance of Amendment 4 to Revised Price Schedule 88 which authorized certain increases in prices of petroleum products on the eastern seaboard, the administrator accepted the principle that it was necessary to reimburse sellers of petroleum products in that area for extra transportation expenses incurred in the movement of petroleum and petroleum products to the eastern seaboard over expenses incurred under normal methods of operation in use prior to June 30, 1941. The price increases granted by Amendment 4 were predicated upon estimated increased transportation expenses resulting from average daily tank-car movements of petroleum and petroleum products to the eastern seaboard of the order of 435,086 bbl. for the week ended March 7, 1942, and 439,200 bbl. for the week ended March 14, 1942. Such tank-car shipments have greatly increased since March 14, 1942, as shown by the following table:

Week ended—	Average daily movement of barrels of petroleum and petroleum products
March 21	464,561
March 28	505,993
April 4	525,696
April 11	586,400
April 18	599,500
April 25	564,750

Since increases in the volume of tank-car shipments automatically result in increased expenses to the marketing companies, further price increases to compensate for these added expenditures should be allowed. In determining the increases to be permitted, consideration has been given to the estimates of increased expenses submitted by the companies and endorsed by the Office of Petroleum Coordinator. On the basis of the increased tank-car movement above indicated, it is estimated by the companies that the total extra transportation costs for March 1942 were $12,000,000 as against the earlier estimate of $7,548,194. The companies also estimated that increased transportation expense for April 1942 would amount to $14,000,000.

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Tank-Car Shipments to East Decline; Weather Is Cause

WASHINGTON, D. C.—Tank-car movement of oil into the East Coast averaged 564,750 bbl. a day during the week ending April 26.

This was a decrease of 5.7 per cent over the preceding week, when movement averaged 599,500 bbl. daily and established an all-time high record for the seventh consecutive week.

Oil shipments from California to the Pacific Northwest, however, set a new record for the second successive week, increasing 22 per cent over the preceding week—from 23,980 bbl. daily to 29,314 bbl. daily.

The drop in car loadings destined for the East Coast during the week was attributed primarily to two factors: First, part of the tank cars used to establish the high record of the previous week had not had time to return from New England to the Gulf and Midwest loading points; second, the severe storm that swept through the Midwest and parts of the Gulf Coast last week interfered with the handling of cars.

Weather conditions were so severe that one company was unable to handle its loadings on a normal basis for 2 days.

In moving 564,750 bbl. each day into the East, the 21 companies participating in this movement reported to Deputy Petroleum Coordinator Ralph K. Davies that they loaded 17,575 cars. Including cars that were on the way back for reloading, it is estimated that the East Coast service was employing about 44,000 cars, taken largely from other parts of the country.

On the basis of an average of 225 bbl. per car, the 17,575 loaded cars carried the equivalent of 3,954,375 bbl. of petroleum and petroleum products.

Eastern shipments were: American Mineral Spirits Co., 204 cars; Arkansas Fuel Oil Co., 122; Atlantic Refining Co., 1,988; James B. Berry Sons, Inc., 7; Chalmette Petroleum Co., 30; Cities Service Oil Co., 578; Continental Oil Co., 131; Gulf Oil Corp., 1,214; Hartol Products, 144; Pan American, 1,250; Petrol Corp., 208; Petroleum Heat & Power Co., 108; Pure Oil Co., 193; Shell Oil Co., Inc., 1,098; Sinclair Refining Co., 1,551; Socony-Vacuum Oil Co., 1,955; Standard Oil of Kentucky, 135; Standard Oil of New Jersey, 3,298; Sun Oil Co., 1,205; Texas Co., 1,800; and Tide Water Associated Oil Co., 356.

The seven companies that participated in the Northwest movement reported loading 912 cars during the week, compared with 746 cars during the week ended April 18. This is an average movement of 29,314 bbl. a day for the week ended April 25.

Allowing time for the cars to return to California, after unloading, it is estimated that 2,210 cars are engaged now in Pacific Northwest service. During the preceding week, 1,825 cars were in service.

Northwest shipments were: General Petroleum, 38 cars; Richfield, 64; Shell, 248; Standard of California, 293; Texas Co., 21; Tide Water Oil Co., 139; and Union Oil Co., 109.

•

Welding Society Decides to Hold Annual Meeting

The American Welding Society, a technical organization serving the government and industry on matters pertaining to war-important welding processes, will hold its annual meeting this year as usual, according to a decision of the executive committee. It will be the society's twenty-third annual meeting.

In making the decision, officials of the society expressed their belief that the best interests of the war effort would be served by intensifying their educational engineering program.

This year's annual meeting of the society, which is now definitely scheduled, will be held in Detroit, Mich., during October. Arrangements have already been made for hotel accommodations and the program committee is scheduling the preparation of technical papers on the subjects of most timely interest. It is expected that some 60 papers will be presented this year.

Membership in the society now totals 4,931, an increase of 3,557 since 1932. There are 42 local sections throughout the country, including representation in Canada and the Canal Zone.

Nation-Wide Rationing Depends on Transportation

WASHINGTON, D. C.—Indications that nation-wide forced curtailment of gasoline consumption is under consideration may be seen in a statement issued Tuesday, OPC saying that possibility of curtailment in other than East Coast and Pacific Northwest depends entirely on future transportation developments. This statement followed declaration by Coordinator Ickes before Cole committee yesterday that he does not favor national rationing, and also followed executive order giving ODT Director Eastman authority to curtail movements of vehicles.

Deputy Coordinator Ralph K. Davies explained that so long as oil transportation facilities continue ample to meet all requirements in a particular area, the coordinator's office sees no reason for compelling a reduction in gasoline consumption in that area. "However," he added, "we have been calling on all such areas to give up a large percentage of their transportation facilities in order that these facilities might be used to relieve the difficult supply situation along the eastern seaboard.

"Naturally, as more and more tank cars, pipe lines, barges and trucks are transferred to eastern service, it is quite possible that shortages may develop in the areas from which they are taken. If this happens, curtailment of consumption may quite logically follow, as the only way by which reduced supplies can be equitably spread. But regardless of whether this happens or not, we propose to continue calling on inland areas to assist with the transportation problem to the greatest extent possible."

Sale of Cabot Gas Line in New York Approved by FPC

WASHINGTON, D. C.—Cabot Gas Corp. has been authorized to abandon its natural-gas pipe line and other property located in Monroe County, New York, by sale and transfer to the Rochester Gas & Electric Corp. for $100,000 pursuant to the terms of an application filed by the Cabot company under Section 7(b) of the Natural Gas Act. The property involved consists principally of about 20 miles of 14-in. welded steel pipe and unlimited franchises for the rendering of natural-gas service in the towns of Gates, Chili, Wheatland and Greece in Monroe County.

Federal Power Commission Opinion No 74 states that "the record in this proceeding contains convincing evidence of the depletion of the parent company's natural-gas fields in northern Pennsylvania and southwestern New York. There has been a steady decline in production from such area since 1938."

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DEATHS

WILLIAM W. ORCUTT, 73, a director and former vice president of Union Oil Co., Los Angeles, Calif., died last week at a Glendale, Calif., sanitarium after an illness of 6 months. Mr. Orcutt began his service with Union in 1898. Before joining the company he played football at Stanford University when Herbert Hoover was manager of the team. He was born in Dodge County, Minnesota, and went to California as a youth. He is survived by his widow, a son and a daughter.

GEORGE A. MacGILLIVRAY, 80, pioneer oil producer in the Petrolia and Oil Springs (Canada) fields, died at London, Ont., recently.

HARRY D. AGGERS, SR., California oil man, died in a Long Beach, Calif., hospital March 23, following an emergency operation. His most recent connections with the oil industry were with L. H. Wentz, Ponca City, Okla.; Eastern Oil Co., Tulsa; Midco Oil Co., Tulsa, and with the U. S. Department of Interior and U. S. Bureau of Mines. He was the father of Harry D. Biggers, of Union Oil Co. of California.

C. C. HENLEY, 43, Tullos, La., independent oil producer, died at Winnfield, La., last week.

RALPH HAMILTON, assistant foreman in the producing department at Seminole, Okla., for Sinclair Prairie Oil Co., died last week.

LIONEL CHAFFEY WEST, 54, president, West Petroleum, Ltd., and for many years active in oil development in southern Alberta, died at Toronto, Ont., April 25.

JOSEPH C. GILMORE, 75, retired field agent of United Natural Gas Co., died at Oil City, Pa., last week after an extended illness. He had retired from active duty in 1929. His widow and three daughters survive.

Petroleum Section Created In Dallas Price Office

DALLAS, Tex. — A petroleum section in the price division of the Dallas region, Office of Price Administration, has been created under the direction of Osher Goldsmith, a consulting petroleum engineer from Tyler, Tex. Mr. Goldsmith has been appointed senior business specialist in the Dallas region which exercises jurisdiction over Texas, Louisiana, Arkansas, Oklahoma, Missouri and Kansas.

Inquiries of the petroleum industry pertaining to petroleum and its products under the Price Control Act, originating at points within the six states, should be directed to the Dallas office of OPA in the Tower Petroleum Building.

Mr. Goldsmith is a registered professional engineer and a graduate of the Missouri School of Mines.

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Production Division.—James R. Wylie, Jr., district director; Henry W. Fuellhart, chief development and production analyst.
Natural Gas and Natural Gasoline Division.—Frank M. Brewster, district director; Virgil F. Bowyer, assistant director.
Foreign Division.—Emerson Butterworth, special representative.
Refining Division.—Distin W. Wilson, district director.
Marketing Division.—Louis H. Spiner, district director; Charles A. Lockard, senior analyst.
Legal Division.—Charles L. Harding, district counsel.
Administrative Division.—Walter J. Heisen, office manager.

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Suite 1336, 120 So. La Salle St., Chicago, Ill. Telephone FRAnklin 2983

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Alternate Director in Charge.—Harold L. Wadsworth.
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Materials Division.—Frank L. Hereford, district director.
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Legal Division.—J. P. Rice, district counsel.
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Material Division.—John B. Schuyler, district director.
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Central Hydraulic Pumping Used in Hull-Silk Field

By T. P. SANDERS

Hydraulic pumping installations in the Hull-Silk and K.M.A. fields of North Central Texas have two unusual features: (1) The wells are pumped with the casing heads closed, and (2) the pumping equipment is installed and put in operation before the wells cease flowing. Loss of production and gas wastage are prevented by the latter. An outstandingly efficient hydraulic pumping plant installation is described.

DURING the past year a number of leases in the Hull-Silk field of North Texas have been equipped with central hydraulic-power pumping systems, and most of these installations are being extended to include new wells. (For a comprehensive description of the hydraulic pumping equipment and its central-power application the reader is referred to the Producing Equipment Directory, Pages M-4 to M-7).

On Continental Oil Co.'s L. W. McCrory lease 17 wells are now on the hydraulic pumping system while four flowing wells and one well yet to be drilled will eventually be added. On the Texas Co.'s Wilson-A lease 10 wells are pumped by hydraulic power while one more is to be added soon. Five wells on Cities Service Oil Co.'s Wilson-C lease and four wells on Gulf Oil Corp.'s Seigel lease are now hydraulically produced.

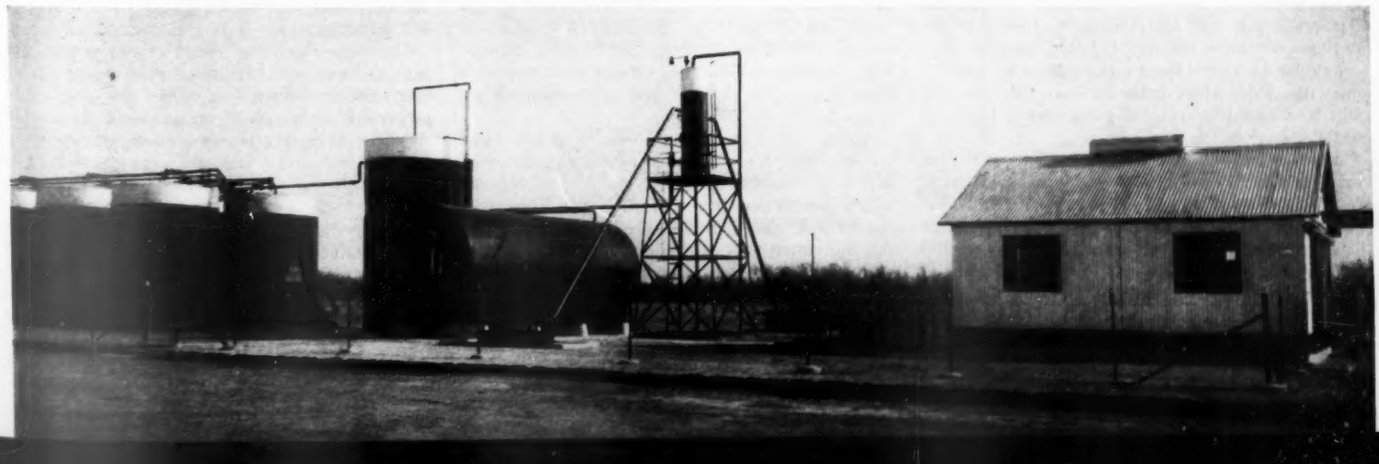
The central hydraulic pumping systems at Hull-Silk are distinctive in that the wells are pumped with their casing heads closed. All gas produced with the oil passes through the pump and up the tubing to reach the surface. Since expansion of gas in the tubing reduces the weight of the fluid column, there is a corresponding reduction in the power-fluid pressure that must be used in the pumping system.

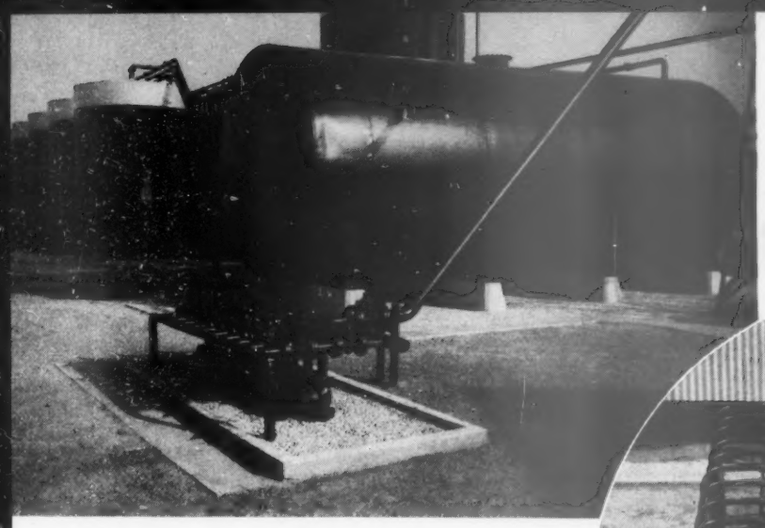
Another unusual feature found in both the Hull-Silk and K.M.A. fields is the equipping of many of the wells with hydraulic pumping equipment before natural flow ceases. This is done for two reasons: (1) The early installation of subsurface pumping equipment avoids the possibility of losing production during the final stages of uncertain flow, and (2) the producing gas-oil ratio can usually be lowered sufficiently to avoid the production penalties applied in this area against inefficient use of gas.

The penalty for excessive gas-oil ratio takes effect on wells which produce more than 2,000 cu. ft. of gas per barrel of oil. Throughout most of the average well's flowing life it is not difficult to regulate the production rate in such a manner that penalty will be avoided. However, during the last stages of flow it is not unusual for gas-oil ratios to rise to 4,000 cu. ft. per barrel, in which case the excessive gas-oil ratio penalty involves one-half of the well's normal allotment.

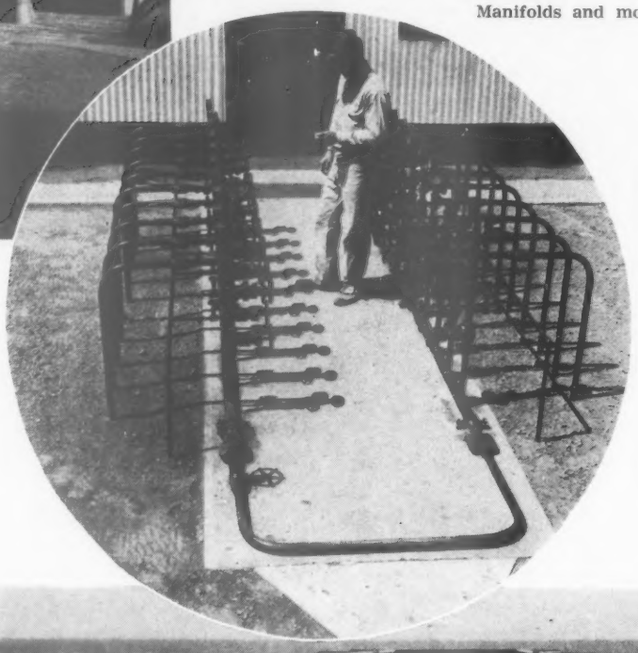
It has been found that excessive gas-oil ratio in a well of this type can be avoided by pumping from bottom with the casing head closed. The fact that the hydraulic pump operates with little clearance, or cushion, at the ends of the stroke makes it possible in most wells of the area to

Central hydraulic pumping plant and part of central tank battery at Continental Oil Co.'s McCrory lease in the Hull-Silk field of North Texas



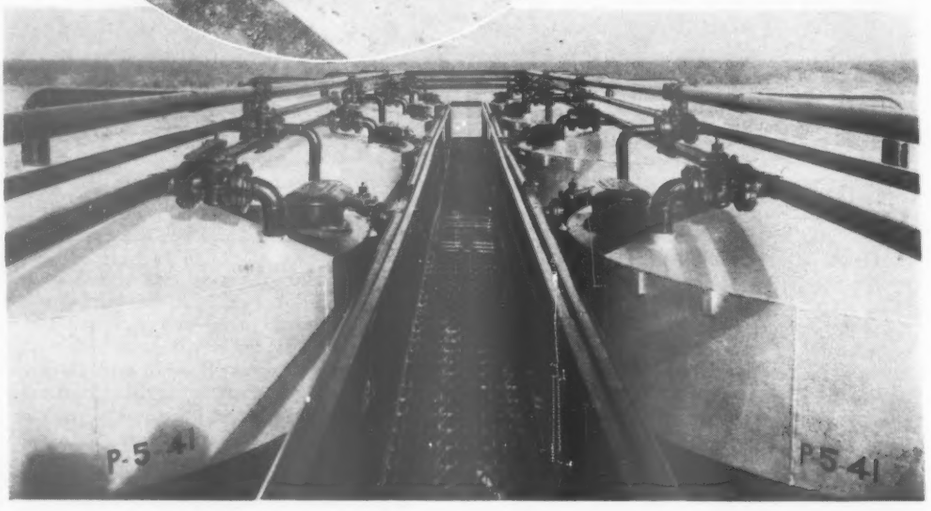


Left: All manifolds at the Continental plant were shop-made by electric welding



Left: The discharge lines from the two large triplex pumps are joined into a loop from which the power-fluid lines to the wells take off

Below: Four lines join the tops of the ten 1,000-bbl. tanks. Reinforcing the rail is an equalizer line, while the three lines on top of the tanks are for vapor recovery, for conducting oil from the gun barrel, and for conducting oil from an individual well directly to a stock tank for gaging



carry out this pumping practice without gas difficulties. There are, of course, some wells where the amount of gas, or perhaps the free condition of the gas in oil under pressure, makes it impossible or inadvisable to produce all formation gas through the pump.

On one well in the K.M.A. field the practice described above for avoiding excessively high gas-oil ratios was varied in an interesting manner. Instead of running the hydraulic pump assembly when flow became inefficient, only the ¾-in. tubing commonly used for the power-fluid string was run inside of the regular 2-in. tubing. By flowing the well through the small string improvement in the gas-oil ratio status was accomplished, but since a free-gas stringer was believed to be exposed in the well, the tests were not considered conclusive in so far as other wells are concerned. The ¾-in. tubing will later be used as the power-fluid string when the well is equipped for hydraulic pumping.

Put Pumps in Flowing Wells

Two concerns in the Hull-Silk field, Continental Oil Co. and Gulf Oil Corp., have been most active in introducing the practice of running hydraulic pumping equipment before natural flow ceases. The well is ordinarily killed with oil so that the 2-in. tubing can be pulled for installation of a 12-ft. gas anchor. After the 2-in. string has been set very close to bottom, the subsurface unit of the hydraulic pumping system is run on the ¾-in. power-fluid string and is set just above the anchor. Fluid levels are high, usually about 2,000 ft. below the surface in the 4,350-ft. wells producing from the Hull-Silk formation; there is little drawdown at the pumping rates imposed by proration. The producing gas-oil ratio is usually in the neighborhood of 860 cu. ft. per barrel, but it is evident that comparatively little of this volume passes through the pump as free gas. Progressive liberation and expansion of the gas while passing up the tubing serves to reduce the weight of the fluid column to such an extent that the power-fluid pressure never exceeds 1,000 lb., and it is often as low as 500 or 600 lb.

With casing-head connections closed, Hull-Silk casing pressures are found to vary from 100 to nearly 800 lb. while the wells are being pumped. In some wells of the K.M.A. field it has been found necessary to install regulators on the casing heads that will allow a small amount of gas to bleed off while the well is being pumped, thus providing enough differential to keep oil coming into the hole. It is believed that this practice will be found necessary at some of the Hull-Silk wells.

Another possible operating change is indicated by a Phillips Petroleum Co. well in the K.M.A. field. Here it has been found that 200 lb. of back pressure must be held against the tubing head to prevent the well from unloading periodically due to the gas pressure in the closed casing.

Largest hydraulic pumping system of the North Texas area is on Continental Oil Co.'s L. W. McCrory lease. The 17 wells have been placed on the system one at a time during the past 13 months. The longest power line operates a well 3,250 ft. from the two large triplex pumps at the central plant. Power oil is carried to the wells by 1-in. lines and it returns with the production through 2-in. lines to the central tank battery. The lease's allowable is 760 bbl. per day, and oil gravity averages 42° A.P.I.

Design of the central plant shows the benefit of unusually careful planning. The most unusual feature is the use of a horizontal 270-bbl. settling tank for conditioning the power oil. Operation of the plant has proved this horizontal tank to be superior to a vertical tank of comparable size. About 800 bbl. of oil are conditioned in the tank during a 10-hour day, the oil flowing through from one end to the other. From time to time a small amount of paraffin and silt is drained out of the bottom of the vessel.

Piping and manifolding throughout the plant are arranged for maximum flexibility. There is only one separator and one gun barrel through which production from all the wells ordinarily passes, but the manifolds are so arranged that any individual well can be produced directly into any one of the ten 210-bbl. stock tanks. Because of the size of the tanks and their vapor-recovery system, the use of the tanks as separators involves no danger. This system for testing the individual wells was used when the wells were flowing and produced far more gas than at present.

Manifolds and most other fittings at the central plant were entirely shop-made by electric welding following detailed designs made up by Continental's engineering department. By adopting this practice a great many steel fittings were saved and much neater appearance was attained.

Atop the tank battery there are four lines that tie into all tanks. Reinforcing the rails of the catwalk is an equalizer line that the pumper can adjust to conduct the overflow from any one tank into any other tank. Three lines situated directly above the tanks each have separate functions. One is the vapor-recovery line, a second is the oil line from the gun barrel, and the third is the special line that connects the production from an individual well directly into a stock tank for individual gaging.

The same flexibility found at the tank battery is also built into the power-fluid system. The discharge lines from each of the two large triplex power pumps are made into a "loop" from which the 1-in. lines to the wells take off, each line with its individual regulator and pressure gage. The "loop" makes it possible for either engine-pump unit to operate any combination of wells. This is an especially handy arrangement for periods of low allowable, for it then becomes possible for either one of the triplex pumps to produce the allowable from all of the wells during an 8 or 10-hour day.

Oil-Well Pumping Tests

By H. E. DRALLE and E. H. LAMBERGER
Westinghouse Electric & Manufacturing Co.

Maintenance for Victory

Most effective maintenance of pumping equipment can be obtained by installing the proper size unit, rods, etc., and operating at the correct speed and stroke. This article describes tests which will have great influence on design and operation of beam-pumping installations.

FROM long operating experience, petroleum-producing companies had recognized the existence of many variable factors which influenced the economies of oil-well pumping. However, no one, due mainly to absence of suitable instruments but partially to expense and time involved, had been able to definitely segregate and control these variable factors, with the ultimate purpose of minimizing production costs by properly designing and applying equipment used in beam-pumping oil wells.

Largely in the interest of improving economies in their own producing operations, Phillips Petroleum Co. visualized the desirability of and the necessity for obtaining comprehensive and exhaustive test data on pumping wells to facilitate analytical studies of the magnitudes, types and relations of loads occurring in the mechanical system during a pumping stroke. To the Phillips company initiative, therefore, must be attributed the fact that pumping tests were undertaken in the spring of 1940 on their own property and in collaboration with Westinghouse Electric & Manufacturing Co. and Sargent Engineering Corp.

The full results of the tests are so far-reaching and cover so many phases of oil-well pumping problems that their ultimate value cannot be immediately utilized. So far, the most obvious benefit seemed in the direction of proposing to the A.P.I. special subcommittee on well-load formulas' more accurate formulas for calculating from known well conditions, peak polished-rod loads, pump plunger stroke, and peak crankshaft torques. Solutions seem possible for such other problems as predetermining prime-mover horsepower from the hydraulic horsepower, optimum counterbalancing, and the true relation between loads at the polished rod and at any other point in the mechanical system on the pumping well.

Any set of tests carried on with these results already obtained and with these other objects in view must necessarily include accurate measurements of instantaneous load and displacements taken at many preselected points in the mechanical system between the pump plunger at the bottom of the well and the prime mover on the surface. To permit segregation of the effects of many variables, readings had to be taken under various operating conditions of speed, stroke length, counterbalance, pump plunger sizes, tubing sizes, and different types of prime movers. To one skilled in production practices, an appreciation of the mass of data required is at once apparent. It is of interest that it actually required several months to complete the tests, and many months more to carefully analyze them for reaching definite conclusions. No less interesting are the exact nature of the tests and the special equipment required to record the data.

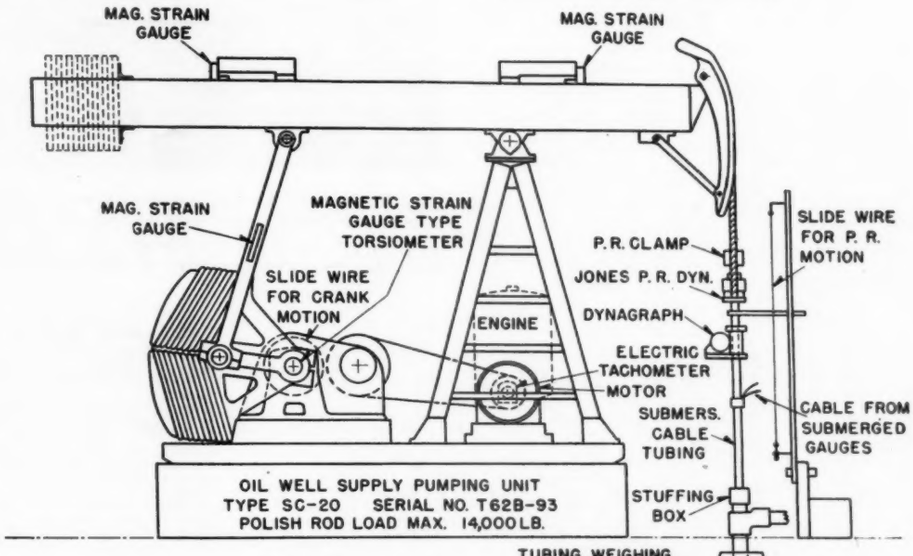
Data Taken

Before actually describing the special instruments required and used, it might be well to indicate the location of the instruments used between the pump and the prime mover and the type of data recorded. Fig. 1 fully illustrates the type and location of instruments in the test set up. Figs. 2, 3, and 4 show the nature of the data recorded by each instrument for a single set of well conditions.

More specifically Fig. 2 shows load and displacement of the pump plunger made with a Sargent bottom-hole dynamometer, Fig. 3 shows load and displacement of polished rod by Westinghouse dynagraph, and Fig. 4 shows oscillographic recording (two oscillographs, each with nine elements used) of the following:

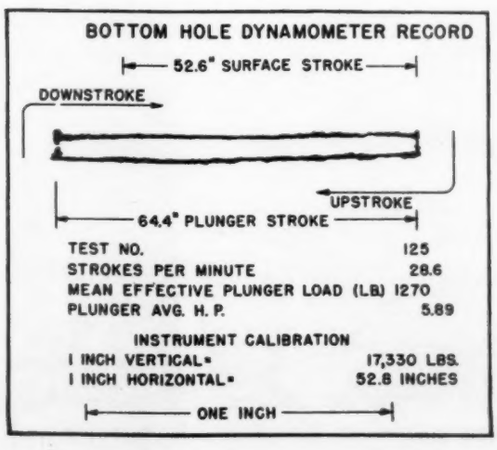
1. Load in string immediately above pump.*
2. Load in rod string at mid-point between pump and polished rod.*
3. Load in polished rod. (Jones dynamometer).*
4. Displacement of polished rod.
5. Tubing load.*
6. Deflection of walking beam forward from sampson post bearing.*
7. Deflection of walking beam to rear of pitman bearing.*

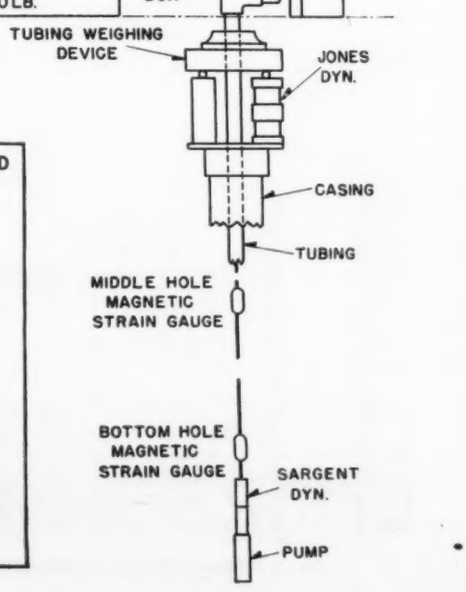
*Obtained with magnetic strain gages.



TEST LAYOUT
FIG. 1

Fig. 2 (Below)





8. Load in pitman.*
9. Torsion in low-speed shaft of speed reducer.*
10. Rotational displacement of low-speed shaft of speed reducer.
11. Prime-mover speed.
12. Electric-motor voltage.
13. Electric-motor current.
14. Electric-motor power input.
15. Timing record.

Besides these 15 simultaneous recordings, the following accurate readings, timed for a particular test, were obtained:

1. Motor-power consumption (watt-hour meter).
2. Pumping speed (s.p.m. obtained with stop watch).
3. Volts, amperes and power consumption (graphically recorded by voltmeter, ammeter, and wattmeter respectively).

Instruments Used and Preparation for Tests

In obtaining the test data considerable preliminary preparation was required in both the field and in the laboratory. In the Oklahoma City field the abandoned well (with original casing) on which the tests were run had to be fully equipped. This included providing a foundation for the pumping unit, erecting a pump house, and installing all pumping apparatus such as prime mover, gear unit, walking beam, rods, tubing, pump, as well as special mechanical apparatus for making desired changes of equipment as the tests progressed.

In the laboratory, instruments had to be calibrated for accuracy. In some instances modifications of standard instruments were required to adapt them to the unusual conditions of location or operation. In still other cases, completely new instruments had to be designed and developed specifically to meet the requirements of application to these tests. Some of these special devices and equipment meriting description include the submersible magnetic strain gage, submersible cable, rod guides and couplings, tubing weighing device, the polished-rod slide wire device, walk-

*Obtained with magnetic strain gages.

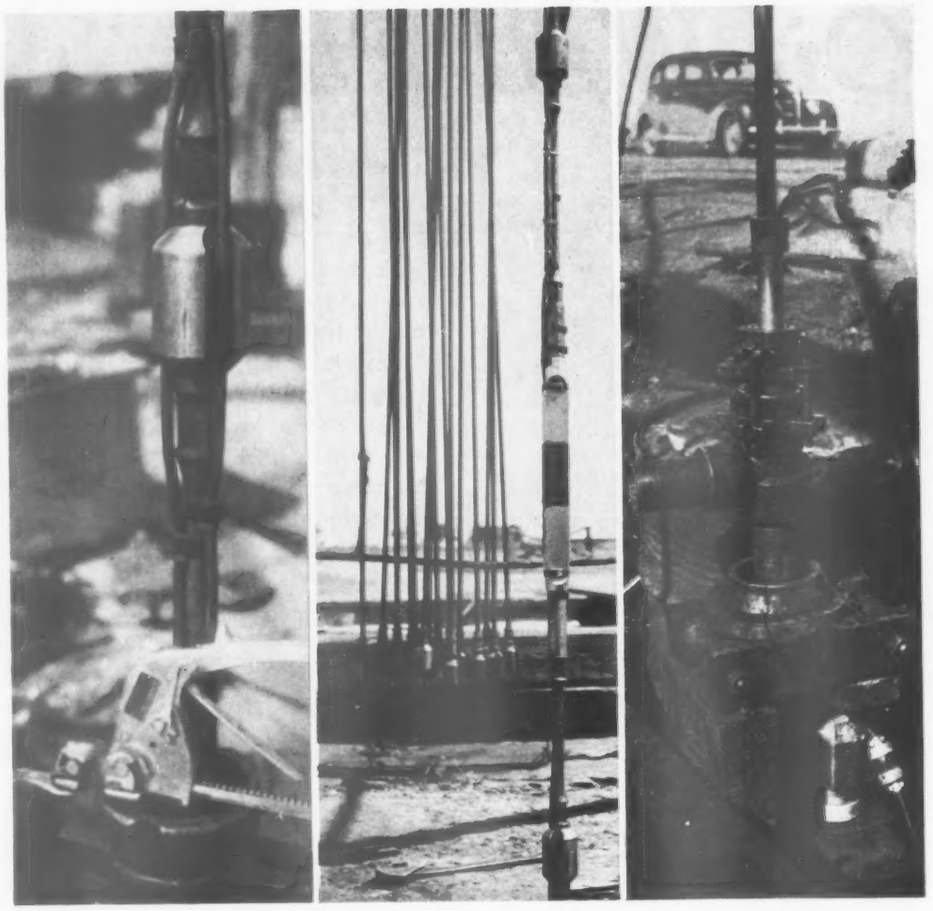


Fig. 5 (Left) Special rod guides provided complete cable protection and adequate space for fluid passage. Note cable clamps at both ends of the guide. Fig. 6 (Center) Bottom-hole submersible gage forming integral part of rod string about to be lowered into well. Fig. 7 (Right) The tubing-weighing device mounted in the cellar. Projecting from the tubing surrounding the polished rod are the cables from the submerged gages

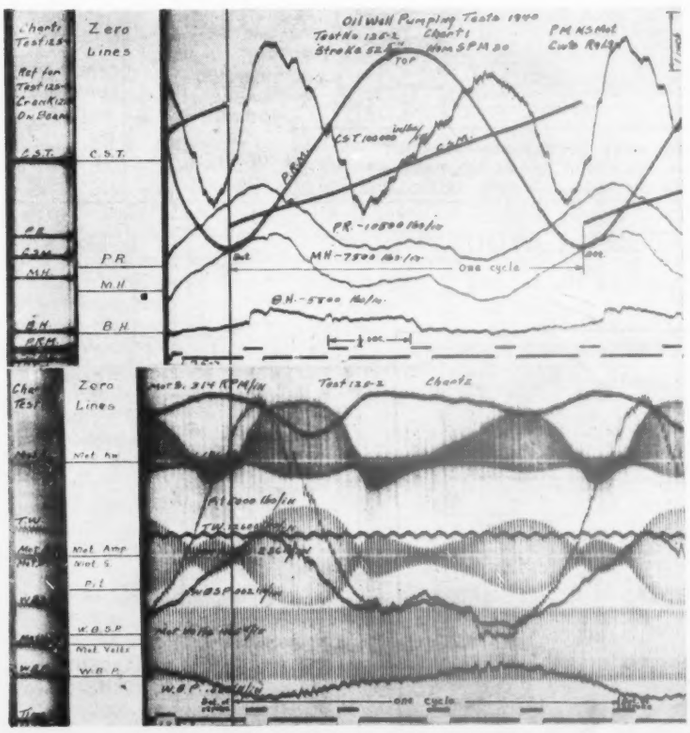
TABLE 1

Abbreviations Used on Oscillograms

P.M.H.S. Mot.: Prime-mover high-slip motor.
P.M.N.S. Mot.: Prime-mover normal-slip motor.
Nom. SPM: Nominal pumping strokes per minute.
Cwts. R.-L.: Rotary counterweights on right side and on left side as viewed from outside test house.
Cwts. B (R): Counterweights—beam (rotary).
P.R.M.: Polished-rod motion.
C.S.T.: Crankshaft torque.
C.S.M.: Crankshaft motion.
P.R.: Polished-rod strain.
M.H.: Middle-hole strain.
B.H.: Bottom-hole strain.
Mot. S.: Motor speed.
Mot. KW.: Motor kilowatts.
Pit.: Pitman strain.
T.W.: Tubing weight.
Mot. Amps: Motor amperes.
W.B.S.P.: Walking-beam deflection at samson post.
W.B.P.: Walking-beam deflection at pitman.
Mot. volts: Motor volts.
Time: Two cycles per second timing wave.

Abbreviations Used on Dynagrams

S.P.M.: Pumping strokes per minute.
M.E.P.R.L.: Mean effective polished-rod load.
Avg. P.R.H.P.: Average polished-rod horsepower.
Max.: Maximum polished-rod load.
Min.: Minimum polished-rod load.
Stat. L.: Static rod load.
Ref.: Fixed reference line.
St.: Stroke length.
T.: Timing wave.



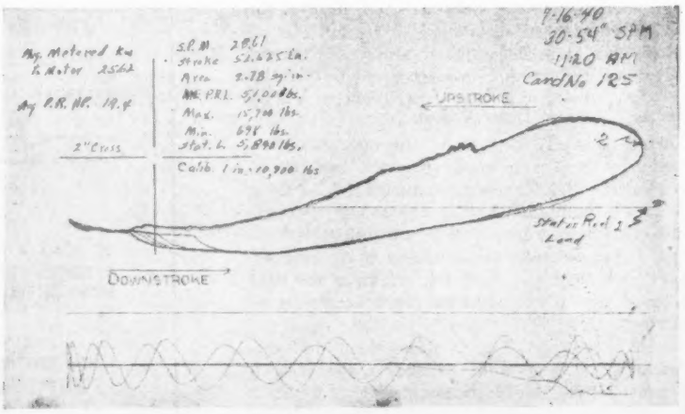


Fig. 4 (left)—Oscilligraph records taken simultaneously with records shown in Figs. 2 and 3. Fig. 3 (right)—Polished-rod dynamometer record

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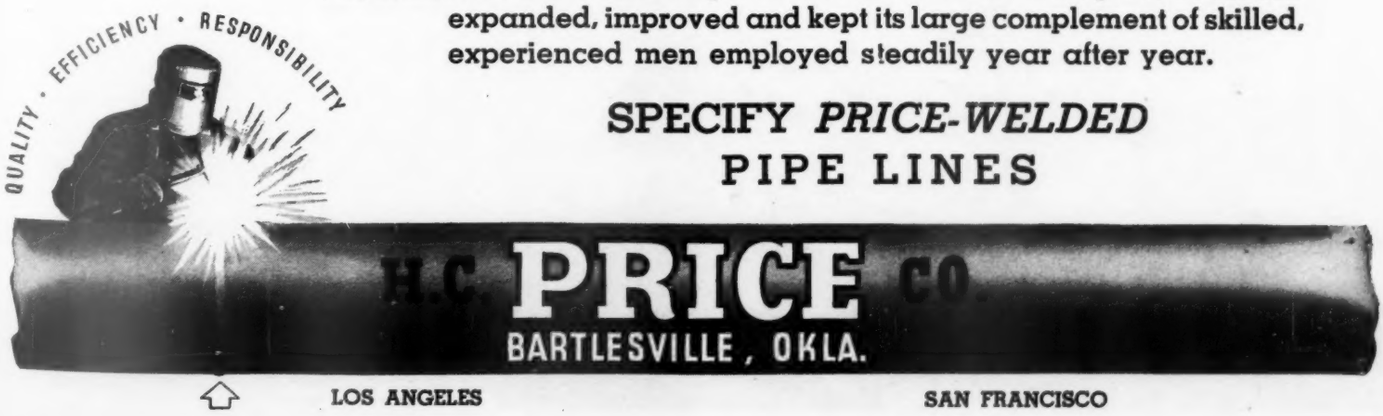

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ing-beam gages, pitman gage, gear unit torsiometer, and the gear-unit slide wire.

Submersible magnetic strain gage.—Of all the instruments used, the magnetic strain gage is unquestionably the most intriguing. This type of gage, now commonly used for accurate measurement of torsional or lateral deflections, consisted essentially of an armature located in an air gap which is common to two magnetic circuits. Movement of this armature caused by load variations increases the reluctance of one of the magnetic circuits and correspondingly decreases the reluctance in the other. These circuits suitably coupled into a bridge circuit and supplied by an external source of power are attached to suitable instruments (in this case an oscillograph) which directly record the load variation.

Magnetic Strain Gage in Rod String

To place such a magnetic strain gage directly in the rod string required development of a housing, that became an integral part of the rod string, and would operate inside 2½-in. tubing, would carry the highest peak loads with safety, would not be affected by the high fluid pressure (as much as 1,750 lb. per sq. in.) and which could be sealed against the exit of the internal insulating oil and the entrance of the external well fluid.

Sealing of the cable entrance was a major problem. The gage compartment was sealed by compressing a neoprene stopper, through which solid bars carried the three conductors, between a tapered Micarta stopper and an internal-compression nut. The external fluid was sealed off by compressing a length of neoprene tubing, which surrounded the cable, between the internal and an external nut. The cover plates were sealed with a cement impervious to crude oil or salt water even with long exposures. The bellows mounted in the side of the case equalized the internal pressures, preventing distortion of the case. The case carried the full rod load.

These gages were subjected to many tests in a high-pressure vessel in the laboratory. During one of these tests, one gage was under continuous test for a period of almost 2 weeks at an average pressure of more than 2,000 lb. per sq. in. The gages were finally sealed, tested, and calibrated to 20,000 lb. Although these gages were lowered into the well three times, and were in actual operation in the well more than 4 weeks, they completed the entire test program without necessity for breaking their seals.

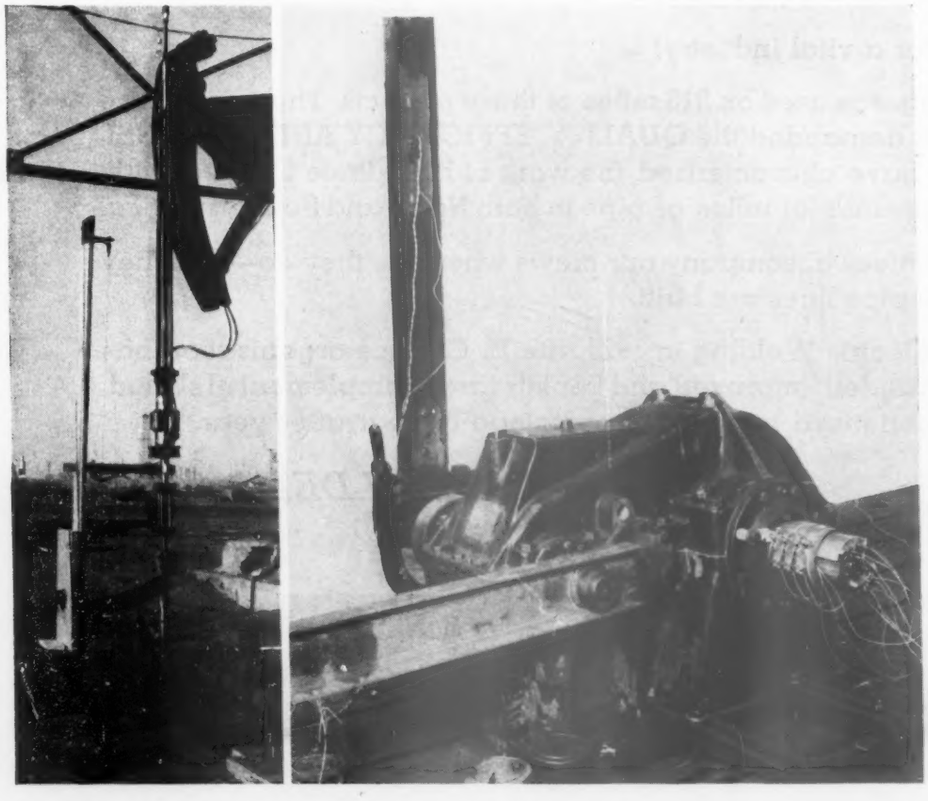
Submersible cable.—The three-conductor cable necessary for electrically connecting the submerged gages to their control devices and their high frequency (840 cycles) power supply on the surface, was of special design having small diameter, high tensile strength, and a neoprene covering. As it was secured to (clamped at 5-ft. intervals) and moved with the rods it was necessary to protect it from wear against the tubing especially at the rod couplings. This was accomplished by passing the cable through slots in special connectors used as rod connectors as well as rod guides. The cable was brought through the stuffing box by means of a brass tube secured to and surrounding the polished rod.

Special Rod Guides

Guides and rod couplings.—An attempt was first made to use in the 2½-in. tubing standard 2¼-in. spiral guides alternating with standard couplings, but after a number of successful tests were completed it was evident that cable clearance was inadequate to prevent cable wear and destruction. Consequently, 3-in. tubing was substituted and special 2¾-in. rod guides made and used at each rod joint. This combination afforded complete cable protection.

Fig. 5 shows one of the special rod guides with the cables for the two submerged gages clamped to the rods. Fig. 6 shows the bottom-hole gage about to be lowered into the well.

Fig. 8 (Left) Polished rod equipped with both electrical and mechanical-type dynamometers. To the left of the polished rod is the slide-wire device for measuring stroke length. Fig. 9 (Right) Torsiometer and slip rings mounted on the end of the unit crankshaft. Pitman gage shown in place on the pitman



Tubing weighing device.—Fig. 7 shows the device for weighing the tubing. The tubing is carried on the crossbars which rest on the block and the dynamometer located between the crossbars and the plate secured to the casing. The Jones polished-rod dynamometer at the right divides the load about equally with the solid block of steel on the left.

Measuring Stroke Length

Polished-rod slide wire device.—This device, shown in Fig. 8, consisted essentially of a contact arm, secured to and moving up and down with the polished rod. The contact arm and stationary wire were connected electrically so that position of the arm on the stationary slide wire caused at any instant a deflection of an oscillographic element proportional to the displacement of the polished rod from the bottom of its stroke.

Walking-beam gages.—These devices were designed to measure the deflection in the walking beam. Their mounting is illustrated by Fig. 1. One end of a small beam was welded to the walking beam directly over the bearing about which pivot the walking-beam deflection was to be measured. This arm remained tangential to the main beam at the bearing. A magnetic strain gage, mounted between the end of the tangential beam and the main beam, measured the relative deflection between the two beams, and thus provided a continuous record of the variations in walking-beam load. It was necessary to shield these gages from direct sunshine to minimize errors and from the weather for protection to electrical parts.

The pitman gage.—So that a magnetic strain gage could be mounted on the longitudinal center line of the pitman a window was cut into the web of the pitman. The gage, thus mounted, measured the elongation or compression in the side members of the window, and consequently measured the variations in pitman load.

The gear unit torsiometer.—The torsiometer was nothing more than two magnetic strain gages arranged to accurately record gear-shaft torque.

The low-speed shaft of the gear unit was fitted with a reference shaft as illustrated by Fig. 10. A portion of the twist in the shaft occurring between the gear seat and the crank seat causes a relative angular motion proportional to the torque load on the shaft between the reference shaft and the main shaft ends at the right. This is true whether the torque is positive or regenerative. The two magnetic strain gages, with armatures mounted on the end of the reference shaft, and their fields mounted on the end of the main shaft compensate for any possible distortion of the reference shaft, measure the relative angular motion between the two shafts, and consequently the shaft torque. Fig. 9 shows the gear unit with gages and slip rings mounted on the crank shaft. The gages are connected to their power supply and control through the slip rings.

Gear unit slide wire.—A slide-wire device similar in principle to that described for recording the polished-rod motion, was used to record the motion of the low-speed shaft of the gear unit.

In this case the contact arm was connected to the shaft. The record obtained showed any appreciable change in crank speed, and also clearly indicated each crank rotation or pumping stroke. This device is shown in Fig. 11.

Other Test Equipment

Besides the special instruments described, test equipment included these standard instruments:

1. A Sargent bottom-hole dynamometer[6] for recording pump plunger load and stroke.

2. Two magnetic-strain-gage type, Jones polished-rod dynamometers[7] for measuring polished-rod and tubing loads.

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4. An electric tachometer for measuring speed of prime mover.

Standard Equipment Used

Except for a few special items, such as the rod couplings, standard pumping equipment was used throughout. This equipment included:

1. Sargent type RSL traveling valve plunger pump.

2. 2½-in. (i.d.) 6.5-lb. per ft. tubing during early tests, and 3-in. (i.d.) 9.3-lb. per ft. tubing during later and major portion of tests.

3. ¾-in. sucker rods.

4. Type SC-20 Oil Well Supply Co. pumping unit.

5. Cast-iron beam-type and lead rotary-type counterweights.

6. Type OP-20 HB Westinghouse Nuttall speed reducer.

7. 25-hp. normal-slip high-torque oil-well pumping motor, frame 444.

8. High-slip high-torque oil-well pumping motor, also frame 444.

9. Waukesha type VIK engine, rated 50 hp., 1,200 r.p.m.

10. Four sizes of V-belt pulleys to obtain four pumping speeds. These pulleys were used on the high-speed shaft of the gear unit. They were of the demountable-rim type so could be changed quite readily—as was frequently required.

11. A variable-pitch type V-belt pulley used on the prime-mover shaft permitted matching (with negligible differences) the corresponding pumping speeds when using either a high-torque normal-slip or a high-torque high-slip pumping motor, or different types of counterweights.

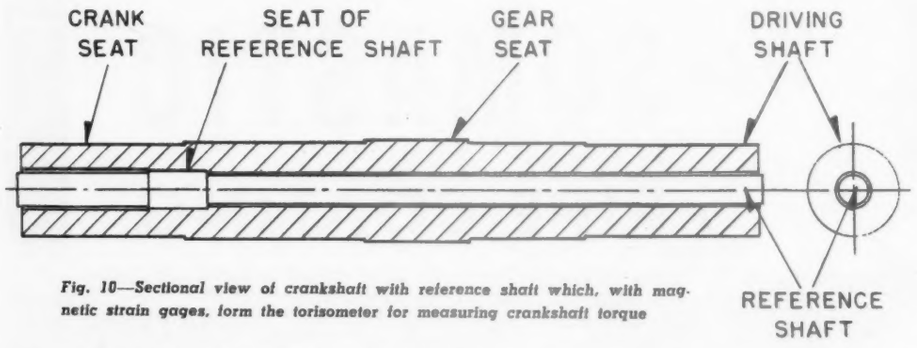

Fig. 10—Sectional view of crankshaft with reference shaft which, with magnetic strain gages, form the torisometer for measuring crankshaft torque

Test Procedure

As the test well had been abandoned for some time, a foundation for the pumping unit had to be poured, the complete well equipment, with the exception of the casing, had to be installed, and an adequate test house built.

When each new setup was completed, the crank was carefully brought to the straight-up or "12 o'clock" position and held by setting the brake on the high-speed shaft of the gear unit, and a "reference" or "zero" record made on both the oscillograph film and on the dynagraph chart. The well was then pumped for a short time, during which the pumping speed was checked. If the speed were correct, the complete rod string, supported on a thrust bearing, was revolved several times to bring the stylus of the bottom-hole dynamometer to an unused portion of the record cylinder, after which the dynagraph and oscillograph records were made simultaneously. At the same time, wattmeter-disk revolutions were counted for a definite period to determine the rate of power consumption. By automatic means, three complete pumping cycles, at full pumping speed, were recorded by the oscillograph on a length of film approximating 2 ft.

When all observations had been completed, the rod string was again revolved several times to carry the stylus of the bottom-hole dynamometer to a new intermediate "changeover" surface. The well was then shut down, and the next test set up prepared—such as changing a pulley for the next pumping speed, changing the crank pin for the next stroke length, change in amount of counterbalance, change in prime mover, or change in type of counterbalance.

An attempt was made to hold the total time per test to a minimum—5 to 10 minutes—so that the fluid level in the well would not be affected appreciably.

Two nine-element oscillographs were used to record the 14 different loads, displacements and speeds previously listed. The combined characteristics of the magnetic-strain gages, their control and the oscillographs were such that load variations with a frequently of 18,000 cycles per minute could be recorded with a minimum accuracy of 90 per cent.

A series of long runs were made—6 to 8 hours each—with the normal-slip and high-slip electric motors to compare the temperature rise and general performance of these two types of motors which were built on frames of the same size, but due to difference in slip characteristics could not be of the same continuous rating. Even during these long-period tests there was no change in casing-fluid level. Fluid production for the tests was determined by tank measurements of liquid levels.

Range and Types of Tests Made

Approximately 350 different tests were made, including over 200 different operating conditions. The test records included more than 200 bottom-hole dynamometer cards, 400 polished-rod dynamometer cards, and 900 ft. of record from each of the two oscillographs.

The various conditions under which tests were made include the following:

1. Three plunger conditions: 1¼-in. plunger, 1¾-in. plunger, and 1¼-in. plunger without traveling valve.

2. Two tubing sizes: 2½-in. and 3-in.

3. Rod strings with all standard couplings, with alternating spiral and standard couplings, and with all special couplings. All tests were made with ¾-in. rods.

4. Beam and rotary-type counterweights, separately and in combination.

5. Three prime movers: two electric motors and one engine.

6. After a few tests at 4,500-ft. depth, the pump was set at 3,500 ft. for the remainder of the program.

7. Forward and reverse crank rotation.

8. Short tests of many normal operating conditions.

9. Long-period tests under normal operating conditions to compare performance of two types of electric motors.

10. Shock and friction tests to study and secure data for determining the over-all damping factor of the well.

These tests, which have been so valuable in segregating the effects of individual variables in a pumping well and in pointing the way for improved methods of equipment rating, have aroused a widespread interest that cannot help but produce further studies of a similar nature on wells presenting different operating conditions. Such additional data can only enhance present results.

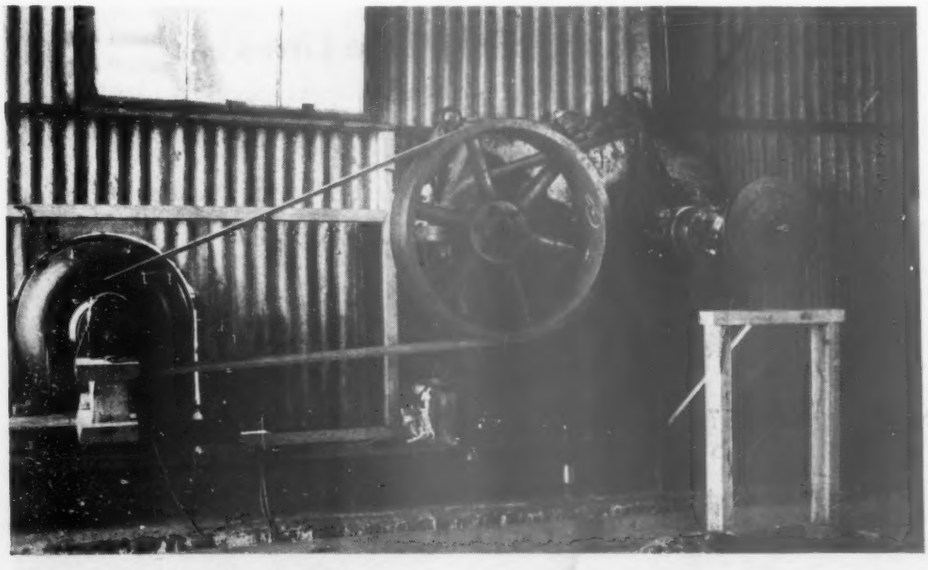

Fig. 11—Special test equipment on the motor and gear unit located inside the test house

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4. "Oil-Well Recording Dynamometer of New Design," by J. G. Baker and H. C. Werner, Petroleum Engineer, July 1936.

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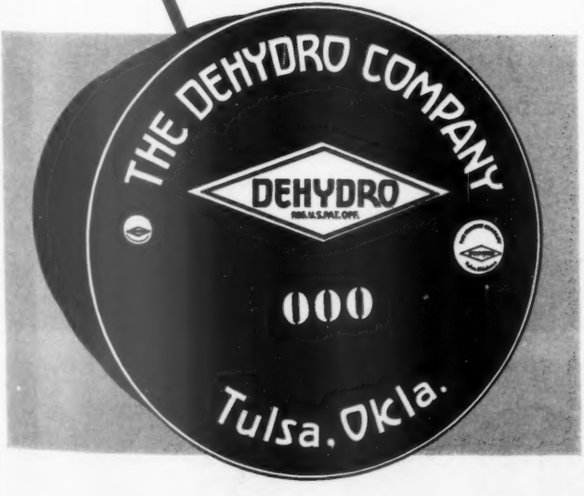

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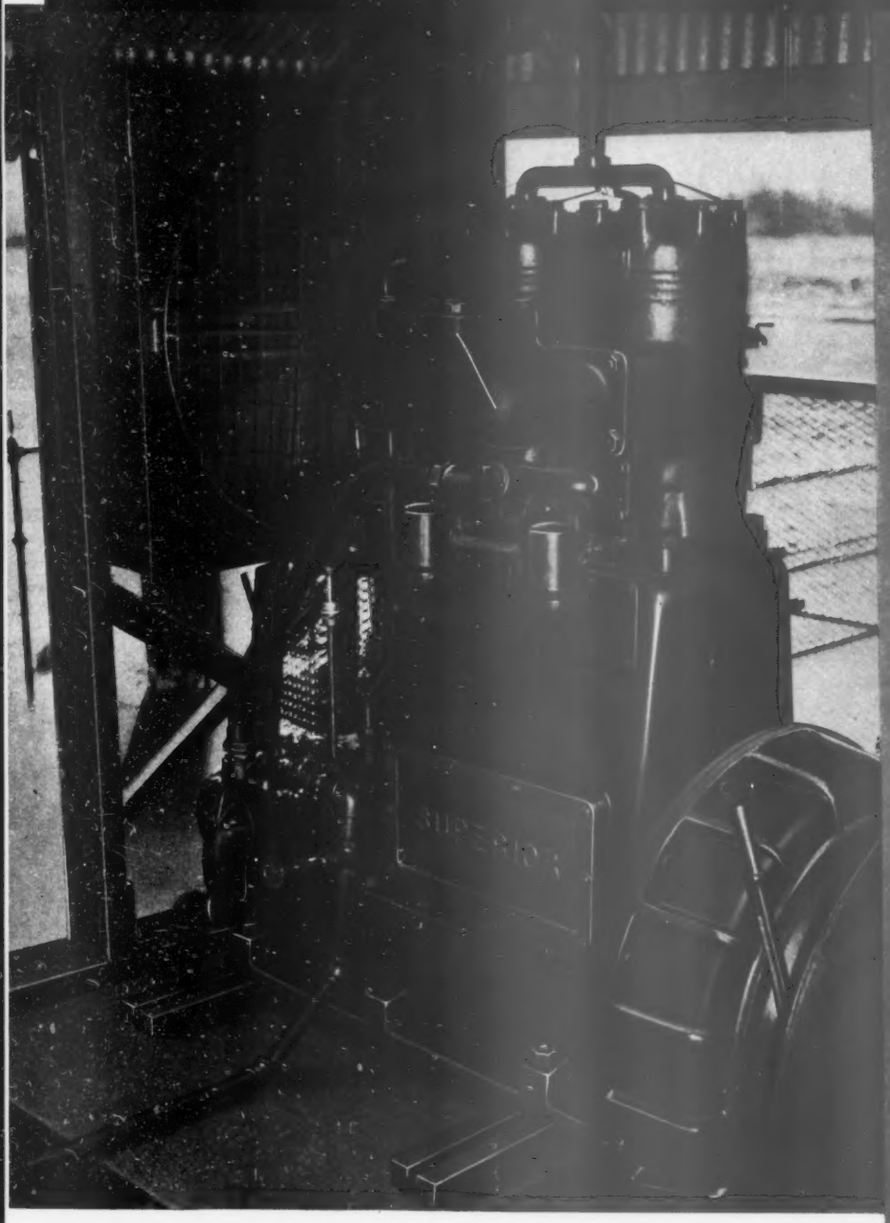

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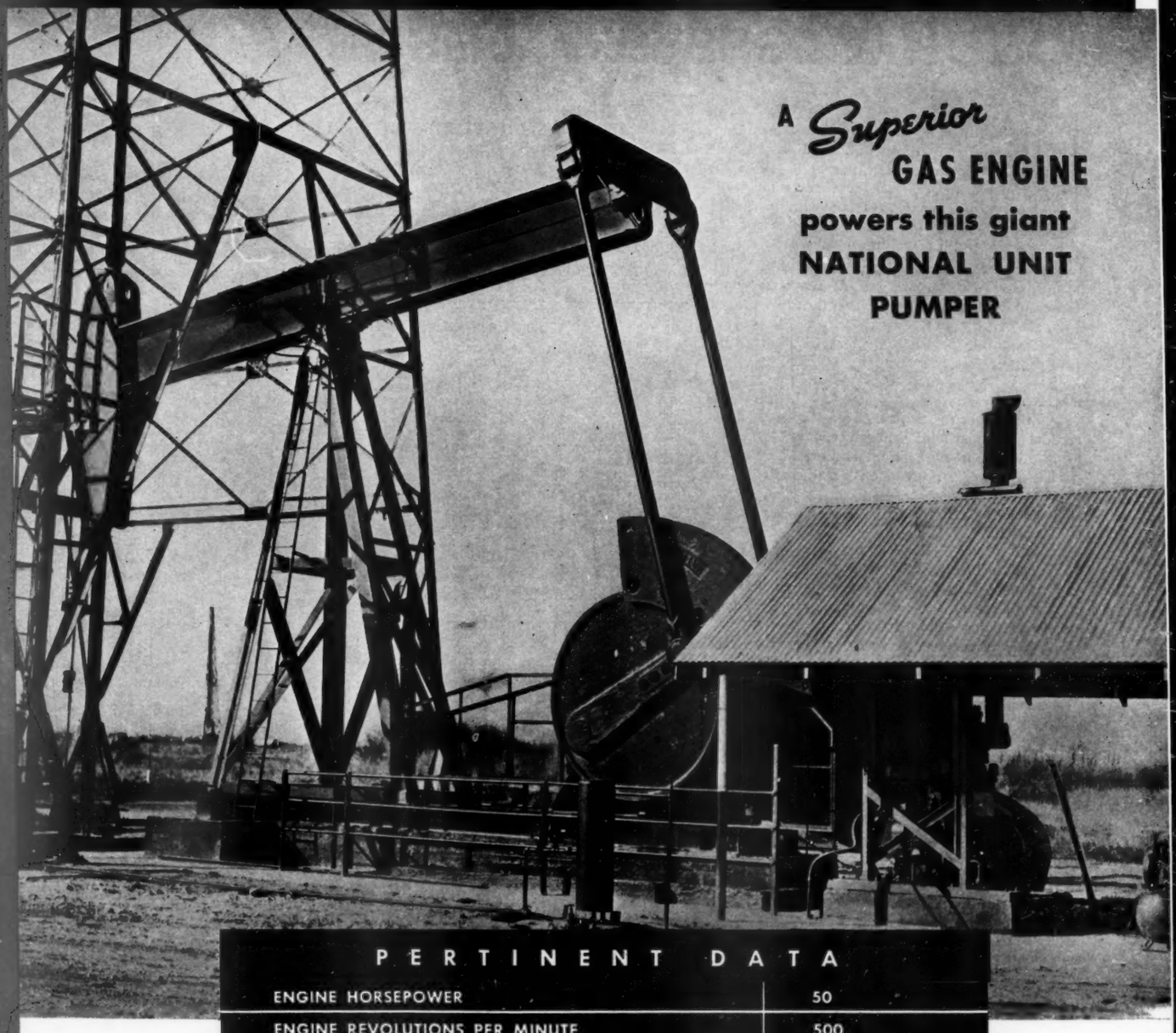

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Calculation of Back-Pressure Tests

By J. WILLIAM FERGUSON
Assistant Gas Engineer, Canadian River Gas Co.

IN response to a general demand for tables of wider scope than those published in a previous article,* the author has prepared tables for use in calculating back-pressure tests on wells having GL values up to 7,000, and equipped with any standard casing or tubing size. (G = gravity of gas; L = length of column.)

A brief review of the simple method of calculating these tests as set out in the above-mentioned article will serve to illustrate the value of these tables.

The formation pressure, P_c, may be obtained by the equation

$$P_c^2 = e^s P_w^2$$

in which

P_c is the shut-in rock pressure at the well head, pounds per square inch, absolute, and

e is the base of natural logarithms, 2.718 . . . . .

S is a symbol to represent the value of

$$S = \frac{2\,G\,L}{53.34\,T}$$

in which

G is the specific gravity of the gas,

L is the average depth of gas pay, in feet

T is the absolute flowing temperature of the gas in the producing string.

Values of e^s corresponding to various values of GL may be found in Table 1. Once obtained for a well, this factor remains constant, depending, as it does, only upon the GL of the well and the flowing temperature, which is assumed to be constant.

The pressure at the sand face at a depth L which is assumed to be opposite the gas pay, may be obtained by the equation

$$P_s^2 = e^s P_w^2 + R^2$$

during conditions of flow. In the above equation,

S_s is the pressure at the sand face, absolute

e^s has the same meaning as above

P_w is the working pressure at the well head, absolute and

$$R = \sqrt{P_c^2 - e^s P_w^2}$$

that is, the effect of flowing friction in the producing string.

To calculate R, we make use of a simplified form of Weymouth's formula

$$R = Q\,F_q$$

When Q, the quantity flowing, is expressed in millions of cubic feet per day at a base pressure of 14.4 lb. base temperature 60° F., and a flowing temperature of 80° F. is assumed.

$$F_q = \frac{\sqrt{GLj}}{0.04896\,d^{5/2}}$$

in which

$$j = (e^s - 1)/S$$

and d = internal diameter of flow string in inches.

We may put the reciprocal of the denominator of the above fraction equal to F_d, so that F_d depends upon diameter only, thus:

$$F_d = \frac{1}{0.04896\,d^{5/2}}$$

so that

$$F_q = F_d\sqrt{GLj}$$

For a given well, we obtain the value of $\sqrt{GLj}$ from Table 1, corresponding to the GL of the well, and F_d from Table 2 opposite the proper size and weight of producing string. If Q is expressed at a pressure base different from 14.4 lb., F_d should be corrected by multiplying by the actual pressure base and dividing by 14.4. It is readily seen that F_q, like e^s, is a constant factor, and remains so as long as nothing is done to change the value of L or the size of the producing string

A sample calculation may help illustrate. Suppose we have a well for which the average depth of gas pay is 3,000 ft., and in which has been installed a string of 8⅝-in., 32-lb. casing, and further, that the specific gravity of the gas is 0.700. We shall assume a rock pressure of 400 lb. per sq. in. abs., a flow of 21,000 M.c.f. per day at 14.4 lb. pressure base, and a working pressure of 300 lb. per sq. in. abs.

Then

$$GL = 0.700 \times 3,000 = 2,100.$$

From Table 1,

$$e^s = 1.1570, \text{ and } \sqrt{GLj} = 47.548$$

From Table 2,

$$F_d = 0.081925, \text{ so that}$$

$$F_q = 0.081925 \times 47.548 = 3.895$$

Now we have

$$P_c = 400$$

so that

$$P_c^2 = 160,000 = 160.0 \text{ thousands.}$$

Then

$$P_s^2 = e^s P_c^2 = 1.1570 \times 160.0 = 185.1 \text{ thousands.}$$

And

$$R = Q F_q = 21 \times 3.895 = 81.80,$$

since Q must be in millions of cubic feet rather than in M.c.f.

Also,

$P_w = 300$, so that $P_w^2 = 90,000 = 90.0$ thousands

and

$$R^2 = 6,691 = 6.7 \text{ thousands,}$$

so that

$$P_s^2 = e^s P_w^2 + R^2 = 90.0 \times 1.1570 + 6.7 = 104.1 + 6.7 = 110.8 \text{ thousands.}$$

It is well worth emphasizing again that, once the values of e^s and F_d have been determined for a given well, the back-pressure calculations for the well may be carried out without further consultation of tables, and these factors remain the same for the well unless either the casing or tubing size is changed, or the well is deepened or plugged back with a resulting change in producing horizons.

TABLE 1

VALUES OF e^s AND $\sqrt{GLj}$

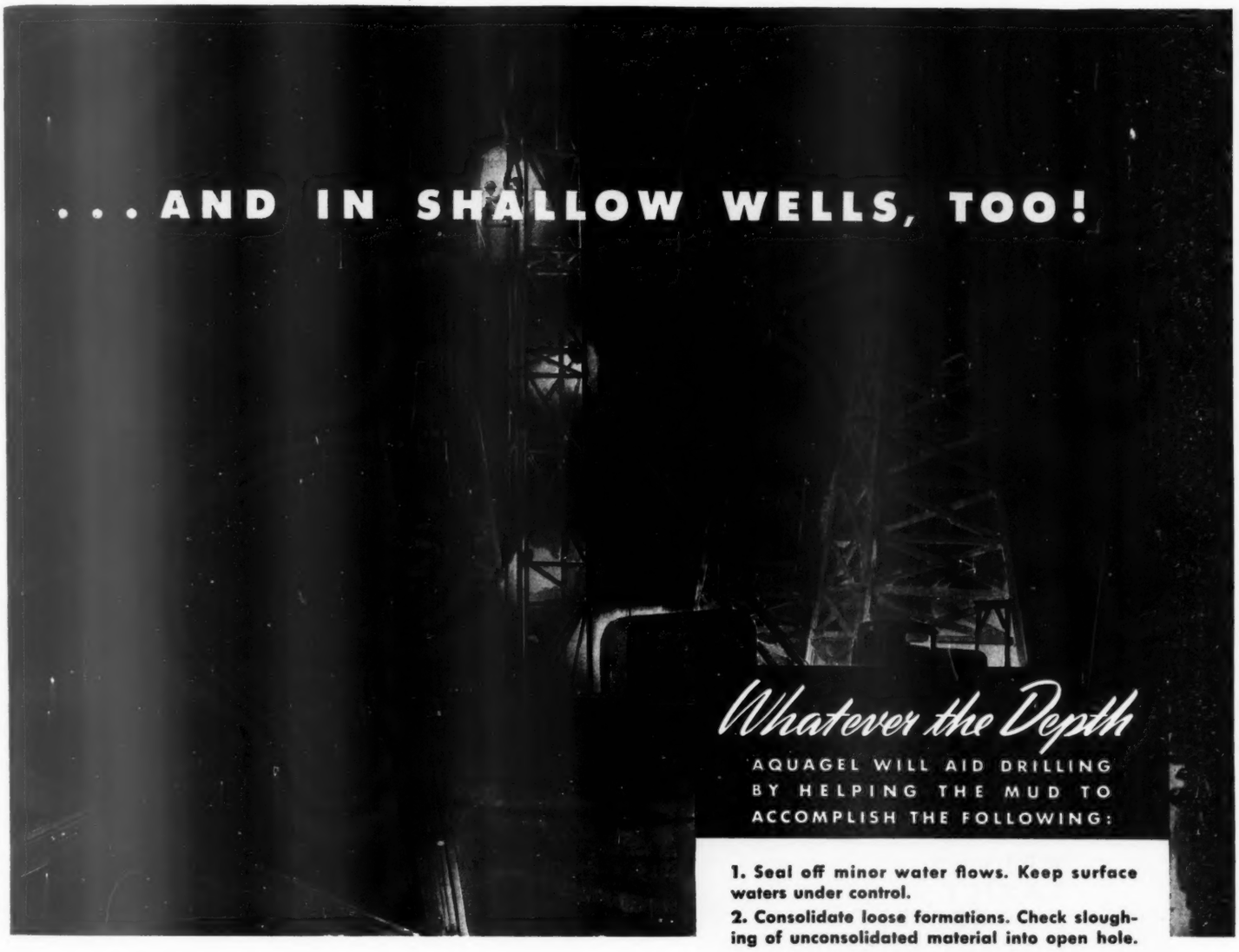
GL	e^s	$\sqrt{GLj}$	GL	e^s	$\sqrt{GLj}$
600	1.0425	24.752	4,100	1.3293	68.871
700	1.0498	26.782	4,200	1.3386	69.833
800	1.0571	28.682	4,300	1.3479	70.788
900	1.0645	30.475	4,400	1.3573	71.737
1,000	1.0719	32.180	4,500	1.3668	72.680
1,100	1.0794	33.810	4,600	1.3763	73.617
1,200	1.0869	35.375	4,700	1.3859	74.549
1,300	1.0945	36.885	4,800	1.3956	75.476
1,400	1.1021	38.345	4,900	1.4053	76.398
1,500	1.1098	39.761	5,000	1.4151	77.316
1,600	1.1175	41.137	5,100	1.4250	78.229
1,700	1.1253	42.478	5,200	1.4349	79.138
1,800	1.1331	43.787	5,300	1.4449	80.042
1,900	1.1410	45.067	5,400	1.4549	80.942
2,000	1.1490	46.320	5,500	1.4650	81.839
2,100	1.1570	47.548	5,600	1.4752	82.733
2,200	1.1651	48.754	5,700	1.4855	83.623
2,300	1.1732	49.938	5,800	1.4959	84.509
2,400	1.1814	51.103	5,900	1.5063	85.392
2,500	1.1896	52.250	6,000	1.5168	86.273
2,600	1.1979	53.380	6,100	1.5274	87.151
2,700	1.2062	54.495	6,200	1.5380	88.026
2,800	1.2146	55.594	6,300	1.5487	88.898
2,900	1.2231	56.680	6,400	1.5595	89.768
3,000	1.2316	57.753	6,500	1.5704	90.636
3,100	1.2402	58.813	6,600	1.5814	91.501
3,200	1.2488	59.861	6,700	1.5924	92.364
3,300	1.2575	60.899	6,800	1.6035	93.225
3,400	1.2663	61.926	6,900	1.6147	94.084
3,500	1.2751	62.944	7,000	1.6259	94.941
3,600	1.2840	63.952			
3,700	1.2929	64.952			
3,800	1.3019	65.943			
3,900	1.3110	66.926			
4,000	1.3201	67.902			

TABLE 2—VALUES OF F_d FOR VARIOUS CASING SIZES AND WEIGHTS

Note: $F_q = F_d\sqrt{GLj}$

Size—	Weight per ft. (lb.)	Wall thickness	Size i.d. (in.)	F_d
1⅛" Nominal	2.27	.140	1.380	8.6527
1½" Nominal	2.71	.145	1.610	5.7362
2" Nominal	4.43	.190	1.995	3.2382
2½" Nominal	6.16	.217	2.441	1.8908
3" Nominal	8.80	.254	2.992	1.0988
3" Nominal	9.91	.289	2.922	1.1704
3½" Nominal	9.10	.226	3.548	0.69750
3½" Nominal	10.45	.262	3.476	.73664
4" Nominal	12.24	.271	3.958	.52107
4¾" o.d.	16.00, 16.25	.334	4.082	.47992
5" o.d.	13.00	.253	4.494	.37137
	15.00 & 15.30	.296	4.408	.39100
	18.00 & 18.30	.362	4.276	.42402
	21.00 & 21.10	.423	4.154	.45805
5½"	14.00	.244	5.012	.27763
	15.00	.262	4.976	.28302
	17.00 & 17.20	.304	4.892	.29616
	20.00 & 20.10	.361	4.778	.31538
5¾"	14.00	.230	5.290	.24040
	17.00	.280	5.190	.37680
	19.50 & 19.70	.330	5.090	.26643
	22.50 & 22.60	.380	4.990	.28090
6"	20.00	.324	5.352	.23305
6⅝"	20.00	.288	6.049	.16813
	22.00	.318	5.989	.17267
	24.00 & 24.20	.352	5.921	.17801
	26.00 & 26.20	.385	5.855	.18341
	26.50 & 26.80	.394	5.837	.18492
	28.00 & 28.10	.417	5.791	.18886
	29.00 & 29.10	.432	5.761	.19149
7"	20.00	.272	6.456	.14134
	22.00	.301	6.398	.14477
	24.00 & 24.30	.332	6.336	.14859
	26.00 & 26.30	.362	6.276	.15240
	28.00 & 28.30	.393	6.214	.15650
	29.50 & 29.80	.416	6.168	.15963
	30.00 & 30.30	.423	6.154	.16060
	40.00 & 40.20	.582	5.836	.18501
7⅝"	26.40 & 26.60	.328	6.969	.11526
	29.70 & 30.00	.375	6.875	.11952
	33.70 & 34.00	.430	6.765	.12477
8"	26.00	.307	7.386	.098718
8⅛" o.d.	28.00	.320	7.485	.095274
	32.00 & 32.20	.370	7.385	.098756
	35.50 & 36.00	.420	7.285	.10241
	39.50 & 39.80	.470	7.185	.10626
	41.50 & 42.00	.500	7.125	.10866
8⅝" o.d.	28.00	.304	8.017	.079335
	32.00 & 32.70	.352	7.921	.081925
	36.00 & 36.70	.400	7.825	.084631
	38.00 & 38.70	.425	7.775	.086090
	43.00 & 43.70	.487	7.651	.089862
	44.00 & 44.70	.500	7.625	.090680
9"	34.00	.355	8.290	.072557
	38.00	.402	8.196	.074797
	40.00 & 41.20	.425	8.150	.075929
	45.00 & 46.10	.484	8.032	.078939
	54.50 & 55.20	.594	7.812	.085008
9⅝"	36.00	.352	8.921	.059827
	40.00 & 40.60	.395	8.835	.061227
	43.50 & 44.30	.435	8.755	.062730
	47.50 & 47.60	.472	8.681	.064166
	54.00 & 54.20	.545	8.535	.067134
10"	33.00	.308	9.384	.052135
10¾"	40.50	.350	10.050	.043423
	45.50 & 46.20	.400	9.950	.044596
	51.00 & 51.30	.450	9.850	.045814
	54.50 & 54.60	.483	9.784	.046643
	55.50 & 55.80	.495	9.760	.046494
11¾"	47.00	.375	11.000	.034128
	54.00	.435	10.880	.035141
	60.00 & 61.00	.489	10.772	.036088
12"	40.00	.308	11.384	.031144
13"	40.00	.281	12.438	.024594
	45.00	.320	12.360	.025010
	50.00	.359	12.282	.025436
	54.00	.390	12.220	.025781
13⅜"	48.00	.330	12.965	.022017
	54.50	.380	12.865	.022477
	61.00 & 61.70	.430	12.765	.022949
	68.00 & 68.10	.480	12.665	.023436
	72.00 & 72.50	.514	12.597	.023775
	83.00 & 83.50	.600	12.425	.024662

*Calculations of Back-Pressure Tests on Natural-Gas Wells, The Oil and Gas Journal, January 19, 1939.



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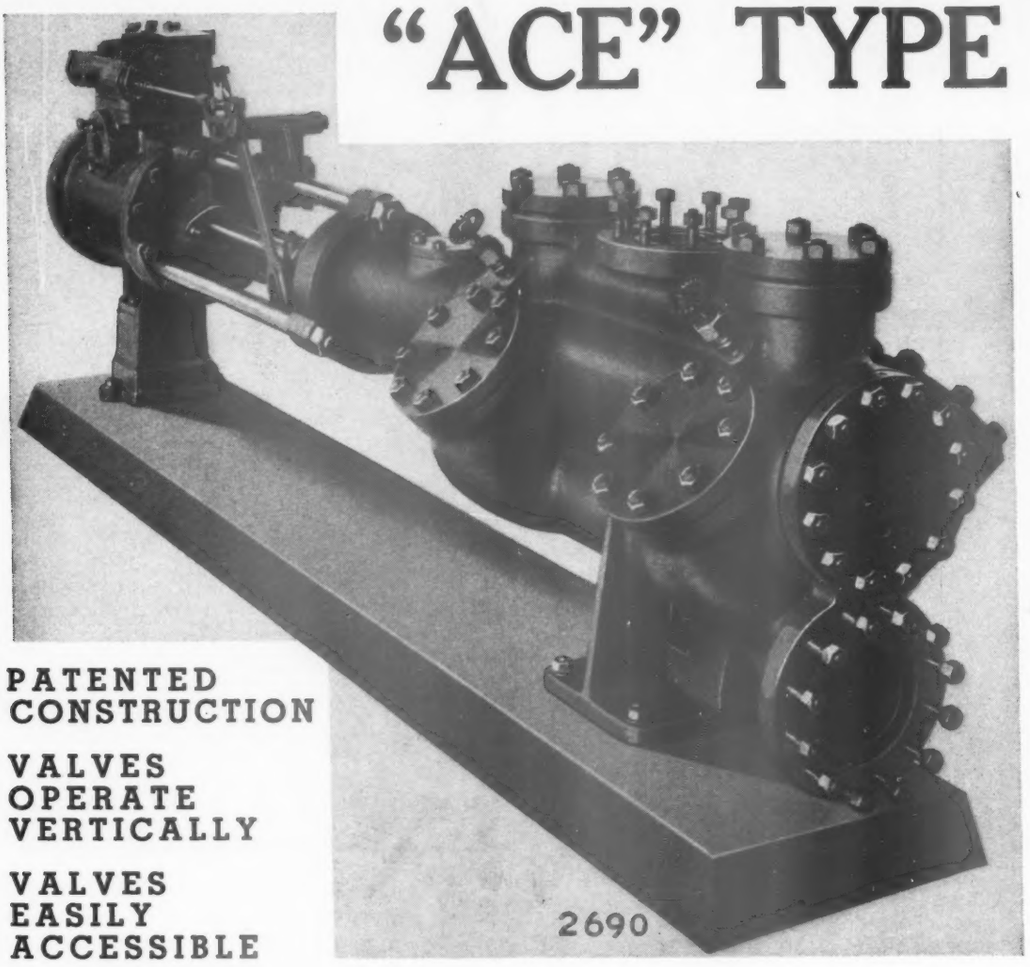

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Clinton Sand Drilling and Production in Central Ohio

By H. N. ROSS
Gas Producing Co. of Ohio, Newark, Ohio*

THE primary gas-producing horizon in Ohio at this time is the Clinton sand, which is productive in the central and eastern portions of the state. This paper is confined to a discussion of Clinton sand drilling and production in Knox, Licking, Muskingum, Perry, Fairfield, and Morgan counties.

The western part of the territory lies within the interior glaciated area; the eastern portion is part of the Appalachian Plateau. While drift deposits are rather spotty, they often range in thickness to 300 ft. in filled preglacial-stream valleys.

The surface rocks of the area are of Pennsylvanian and Mississippian age. The Pennsylvanian rocks consist largely of shales and sandstones, with thin limestones and coals. The Pennsylvanian rocks reach a depth of almost 1,000 ft. in the southeastern part of the area under consideration. All rock units of the region both dip and thicken southeastward.

The Mississippian rocks consist of 500 to 900 ft. of shales and sandstones. The Blackhand member, or Injun sand, and the Berea are the only persistent sandstone units.

The Devonian is approximately 1,000 ft. in thickness, the upper two-thirds dark shale and the balance limestone and dolomite. There is no apparent break between the Devonian and the underlying Silurian rocks, which consist of limestones and dolomites for an additional 700 ft. Between this thick limestone section, known to drillers as the "Big lime," and the Clinton sand there are from 120 to 190 ft. of shales and thin-bedded limestones. The shales are often quite soft and present a problem in drilling and producing.

*A slightly abbreviated version of a paper presented before the Natural Gas Section, American Gas Association, May 4-7.

Clinton Correlates With Medina

The Clinton sand is generally correlated with the Medina group of the Lower Silurian, and lies, in this area, 90 to 120 ft. above the top of the Queenston, or "Red Medina" shale of the driller. Generally, the Clinton is a fine-grained sandstone, varying in color from light gray to pink, with a porosity up to 15 per cent. This sand is water-free, and ranges from 25 to 50 ft. in thickness, often consisting of many thin-bedded sandstones, rather than a single unit. While the sand is rather persistent, production is confined to comparatively small, isolated (or practically isolated) lenses. Virgin reservoir pressure is approximately 300 lb. per 1,000 ft. of depth. Gas wells have initial open flows up to 12 million; oil wells, up to 400 bbl. after shot. A typical section of the area is shown.

All drilling in the area is with cable tools. Standard-rig equipment is generally used; however, there is some drilling done with National machines, and recently there have been a few wells drilled with spudders. The standard rigs have a 22-ft. base and are 84 ft. in height, with an allowable crown-block load of 120,000 to 180,000 lb. Most operators are using steel crown blocks with cast-steel sheaves, although there are some who still use wood crown blocks with cast-iron sheaves.

Bull wheels are 8 ft. in diameter with 12-in. brake wheels; the tug wheel is grooved for two ropes. The shaft is 16 in. in diameter with ½-in. wall thickness. Rig foundations and beams are usually wood. Eleven-foot wood-faced band wheels with 5-in. crankshafts are predominant. Friction sand reels are in general use, although there are some chain-driven reels in service. A single-cylinder two-cycle gas engine is the common motive power. There are some multiple-cylindered engines in service and also a few gas-oil engines.

In the western part of the Clinton sand producing zone, 10-in. drive pipe is now used. Eight-inch casing is set through the Injun, shutting off both cave and water. In the east half of the area, drive pipe, if required, is ordinarily 14-in. with 200 to 250 ft. of 10-in. surface pipe inside and 8-in. through the Injun. Six and five-eighths inch is run through the Berea, shutting off water and the highly abrasive Berea sandstone; then the hole is usually dry for more than 2,000 ft.

GENERAL GEOLOGICAL SECTION SHOWING MAJOR UNITS

System	Series or formation	Important members or beds	Description	Approx. thickness (ft.)	Oil and gas sands and reference bed
PENNSYLVANIAN	Monongahela	No. 8 Pittsburgh Coal	Shale, sandstone, coal	250	No. 8 coal at base
	Conemaugh	Ames Cambridge	Shale, sandstone, limestone	400	Ames and Cambridge limestones used as reference and casing points
	Allegheny	No. 6 Coal No. 5 Coal	Shale, sandstone, coal, clay, limestone	210	Includes persistent No. 6 and No. 5 coals; second Cow Run sand—oil and gas
	Pottsville	Sharon	Shale, sandstone, thin coals	250	Salt sands, and Sharon conglomerate, or Maxon sand—gas and oil
MISSISSIPPIAN	Maxville		Very unsteady, often sandy or shaly	0 to 150	Keener lime of driller
	Logan		Sandstone, shale, conglomerate	170	Keener sand near top—oil and gas
	Cuyahoga	Blackhand	Shales and large sandstone lenses	335	Blackhand sandstone at top has thickness of 10 to 120 ft. and is Injun sand of driller
	Sunbury		Brown to black fissile shale	20	Logged as "Coffee shale"
	Berea		Sandstone, often with shale parting	45	Important oil and gas sand of eastern Ohio
	Bedford		Red and black shale	85	
DEVONIAN	Ohio		Brown and gray to black shale	600	Produces gas in southern Ohio
	Olentangy		Gray, siliceous shale	30	
	Delaware		Thin-bedded gray limestone, variable	45	
	Columbus		Massive light gray and brown limestone	100	Onondaga limestone of New York, Pennsylvania, W. Virginia
	Oriskany		Sandstone, often absent	20	Productive of oil and gas locally
	Detroit River		Medium to thin-bedded dolomites; light gray and brown	170	
SILURIAN	Bass Island		Thin-bedded, drab dolomites	230	
	Salina	Newburg	Dolomites and calcareous shales	400	Newburg sand at base produces oil and gas locally in central and northern Ohio; large flows of brine at lower contact
	Niagara		Massive dolomite	110	Base at "Big lime" of driller
	Clinton	Alger Irondequoit Brassfield	Shales and thin-bedded, often pink or red limestone	160	Alger shale is "Green Cave" of driller Irondequoit is called "first Shell" Usually Brassfield is logged as "second" or "Pink Shell"
	Medina	Whirlpool or Clinton Queenston	White, gray or pinkish sandstone with interbedded shale Soft red shale	1 to 40	The Clinton sand of Ohio is the most important producer of oil and gas Queenston is the "Red Medina" of the driller
ORDOVICIAN	Richmond		Soft blue shales and thin limestones	385	
	Maysville		Thin-bedded limestones and shales	270	
	Eden		Shale with thin limestones	305	
	Cynthiana		Largely limestone, some shale	100	
	Lexington (Trenton or Galena)		Limestones with thin shale partings	260	The Lexington and Highbridge groups are included in the Trenton of the driller
	Highbridge (Lowville, Stones River, Black River)		Limestone	390	Oil and gas are found near the top of the Trenton in Northwest Ohio
	St. Peter		Sandstone and dolomite	30	Source of "Blue Lick" water not productive or oil or gas
	Beekmantown (Calciferous)		Dolomite and sandstone	350	
CAMBRIAN			Dolomites with some shale	350	
ALGONKIAN-ARCHEAN			Metamorphic and crystalline rocks		

Near the bottom of the Niagara lime, a heavy flow of water is encountered, which often fills to within 1,000 ft. of the top of the hole. This water is shut off with 5⅜-in. that is set about 50 ft. above the base of the Niagara. A few operators cement the 5⅜-in.; generally it is set on a shoe and mudded. If the water can be carried while drilling, as is sometimes the case along the west side of the area, the 5⅜-in. is not run. This applies only to gas-well drilling.

Several attempts have been made to shut off the water by cementing, without pipe. This operation has been tried both by cementing in liners and by squeeze cementing. Neither has been successful.

It is customary to run 5½ in. by 35 to 40-ft. stems with 4½-in. joints in the 13-in., 10-in., and 8-in. holes; 4½-in. by 38 to 42-ft. stems with 3¾-in. joints in the 6-in. hole; 3½-in. by 38 to 42-ft. stems with 3-in. joints in the 5-in. hole. Jars are run from top to bottom of the hole. Most operators use link jars; however, we consider swivel jars preferable. West Virginia pattern bits are in general use, although some think it desirable to use heavier stock bits in the lime drilling. The bits are ordinarily dressed with a short bevel except in the lime. The lime bits are dressed with bevels up to 3 in.

At the time wire-line drilling started in this area, 300-ft. crackers were used on 6 by 7 lines. The 6 by 7 line has, in most instances, been replaced by a 6 by 19, and the cracker by a swivel socket. Nevertheless, a great many operators continue using a cracker in the top of the hole. We believe it is desirable to use a swivel socket and a 1-in. 6 by 19 line for the 5½-in. tools and a ⅞-in. 6 by 19 for the remainder of the drilling. A ⅝-in. 6 by 7 sand line is used in the 8-in. and larger holes; ½-in. for the balance.

Drilling Costs

Drilling costs, that is, labor, fuel, water, and tools for drilling, are approximately $1 per foot. The over-all dry-hole cost is approximately $1.25 per foot.

Average drilling speed is 100 ft. per 24 hours. As the cost and speed of drilling indicate, there are few problems in drilling in Central Ohio. Fishing jobs are confined largely to failure of wire and joints. Some difficulty is experienced in the top of the hole with caving. This can be materially helped by the use of Aquagel. The shell immediately above the Clinton sand caves very badly unless drilled with salt water.

Ordinarily the wells are shut in with 3-in. tubing set on step packers. The packer should be set as close to the top of the sand as possible. This is impossible if the well has been shot, in which case a 4-in. perforated flush-joint liner is run that extends into the bottom of the lime, and the packer is set immediately above the top of the liner. The liner is necessary by reason of the cave above the Clinton. Some operators use 2-in. tubing; we have found it unsatisfactory, largely, we believe, because of lack of weight and excessive flexing.

Well-head equipment consists of a tee on the top of the tubing straight with two gates. A 3 by 1-in. swage and a 1-in. Merco are used on the top gate for pressure connections. A 3 by 10-in. braden head is installed and left open. The 3-in. is anchored to the 10-in.

Few wells with more than half a million initial open flow are shot. We consider it desirable to shoot the entire section with the maximum size shell that can be run. Gelatin is used by some in shooting, but nitroglycerin is the most widely used.

Even though the Clinton sand is water-free, in our opinion it is highly desirable to operate gas wells in this horizon with back pressures ranging from one-third to one-half the rock pressure. Although it is impossible to reduce the benefits of such operation to any tangible or specific value, our own operations indicate definitely that recoveries are higher when the rate of withdrawal is lower.

The customary spacing of Clinton sand gas wells has been one well to 40 acres, which results in an average pool spacing of one well to 70 acres, with yields in the richer pools running to 5,000,000 cu. ft. per acre. The average Clinton sand well has a life of 10 years. About one-third of the holes drilled are dry. The total cost of a 4,000-ft. completely equipped Clinton sand well, using all new material, is approximately $12,000.

Clinton sand wells require very little care except to guard against excessive withdrawals. Although they produce only a little distillate, production from these wells is appreciably improved by occasionally blowing them wide open. If and when they will no longer blow, swabbing is carried on by the use of a simple reel mounted on a truck. Most wells will swab with a loose swab, that is, a thin rubber disk on a sinker. A ⅜-in. 6 by 7 line is generally used.

Some trouble is often encountered in wells salting. In some cases this can be eliminated by raising the back pressure on the well. If this is not feasible, shooting will often stop it, but perhaps the simplest method is dissolving the salt in water. Acetic acid or vinegar in some cases appears to be a better solvent than water.

The cost of abandoning and plugging a 4,000-ft. hole is approximately $600 to $800. Mud is the common plugging material. Wells are abandoned under the supervision of the state Division of Mines. An average of 98 per cent of the material is recoverable. Depreciation of well materials is exceedingly low; we have rerun pipe that has been in the ground for 25 years.

Proper Production Methods

By R. O. GARRETT
Production Engineer, Arkansas Louisiana Gas Co., Shreveport, La.* †

IN general, our wells are producing from prolific and high-pressure reservoirs from a depth of 5,000 ft. to 7,000 ft., pressures ranging from 1,500 to 3,000 lb. per sq. in. at the surface, the gas having a considerable fluid content of from 5 to 20 bbl. per 1,000,000 cu. ft.

Our general plan of operation after the well is properly completed is to test it for open-flow capacity, following in general the Bureau of Mines method of back-pressure testing as described in Monograph 7. Care is maintained at all times to be sure that each rate of flow is thoroughly stabilized. If stabilization is impossible due to fluid content or other factors which make surface pressures unreliable, it is then necessary to run a subsurface pressure instrument into the well and obtain pressures by that method. Such tests are repeated at quarterly or semiannual intervals so that availability and reserve studies may be made.

Wells which do not tend to freeze through the formation of hydrates are controlled through surface chokes and wells showings a tendency to freeze up are controlled through the use of regulators.

Where wells are completed sufficiently far above the gas-water contact to minimize the danger of coning and channeling of water, they are produced at a sufficiently high rate of flow to prevent freezing for a period of a few days, and are then closed in for the remainder of the month, while other wells are turned on in a similar manner, to provide a continuous flow of gas to the pipe line; this, of course, is only possible where well capacities greatly exceed pipe-line requirements.

As shown in Fig. 1, after the gas leaves the christmas tree (*A*), the following procedure is carried out:

Condensate and gas are produced from the wells (*A*) into lease separators (*B*) operating at approximately 400 to 500 lb. Gas is removed from the top of the separator and measured by orifice meter (*C*) before being introduced into the plant gathering system, and a dual gravity drip disposes of the water produced.

Condensate is trapped out in the field separator, level of which is controlled by a kidney-operated

(Continued on Page 57)

*"Subsurface Pressure Regulation of High-Pressure Condensate Wells," by John C. Farmer, Otis Pressure Control, Inc., 6612 Denton Drive, Dallas, Tex. A.P.I. Paper 901-18E.

†Slightly abbreviated version of a paper delivered before the Natural Gas Section, American Gas Association, New Orleans, La., May 4-7.

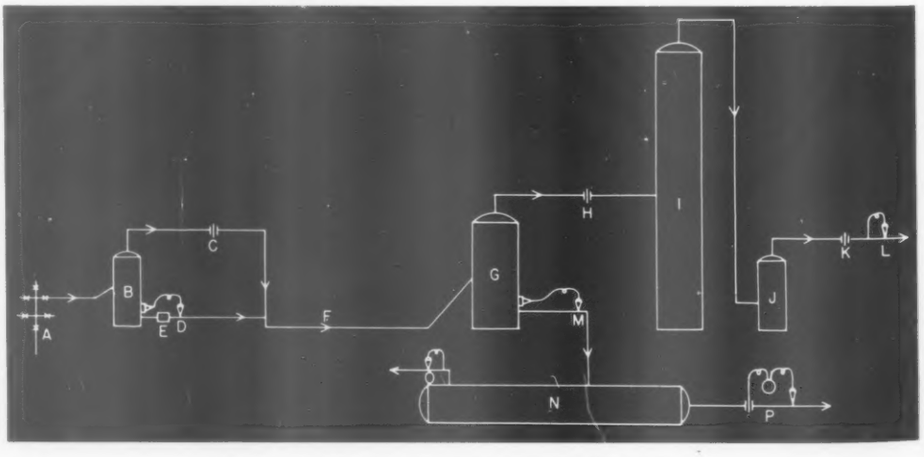

Fig. 1—Simplified flow diagram of gas and condensate flow

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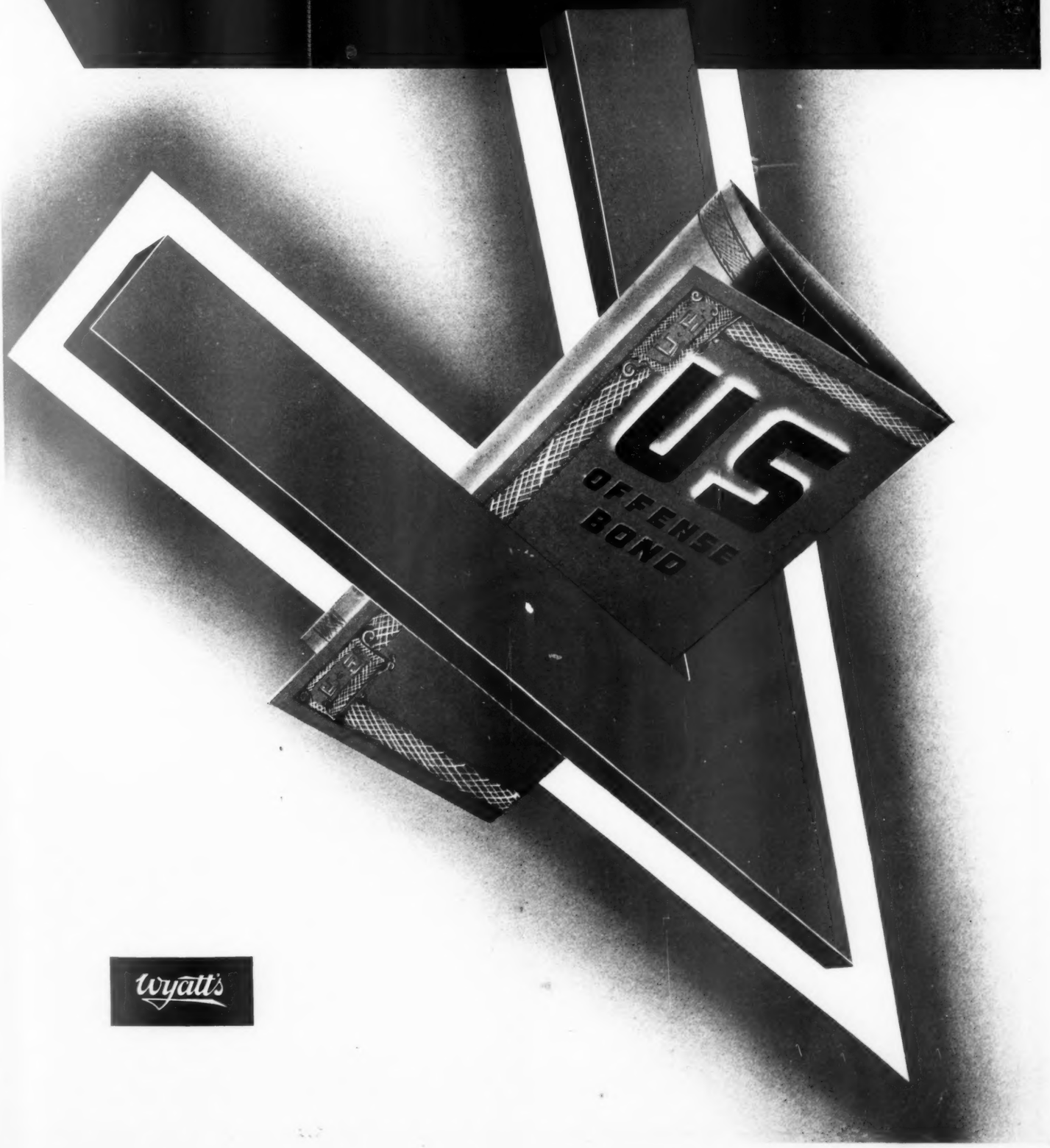


Wyatt's

TYPICAL OIL-FIELD STRUCTURES

Truncated Faulted Anticline

Oklahoma City Field, Oklahoma

(Compiled by The Oil and Gas Journal)

GENERAL GEOLOGY: The Oklahoma City field is one of a number of important accumulations lying along the trend of the Nemaha granite ridge. This ridge extends as an arc convex to the west from the Arbuckle Mountains of Oklahoma through Kansas and into eastern Nebraska. The first important production along this trend was in the El Dorado field, Butler County, Kansas, which was discovered in 1917. The true nature of the structure in this field was not known tor several years and it was thought for some time that the principal producing horizon was the Mississippi lime. Later the unconformity below the Pennsylvanian was recognized and the principal pay was proven to be Arbuckle or siliceous lime, of Ordovician age.

The Nemaha ridge forms an important feature between the eastern Kansas and Oklahoma basin and deeper basins to the west. It is a buried mountain range which was uplifted and deeply eroded before the Pennsylvanian period. Prior to the discovery of this buried range, it was believed that the formations dipped westward from the Ozarks into a deep basin, and many geologists thought that if Ordovician formations carried oil in the vicinity of Oklahoma City they would be out of reach of the drill. The presence of this ridge, indicating regional uplifts of the lower formations, completely altered our views as to the oil possibilities of western Oklahoma and Kansas.

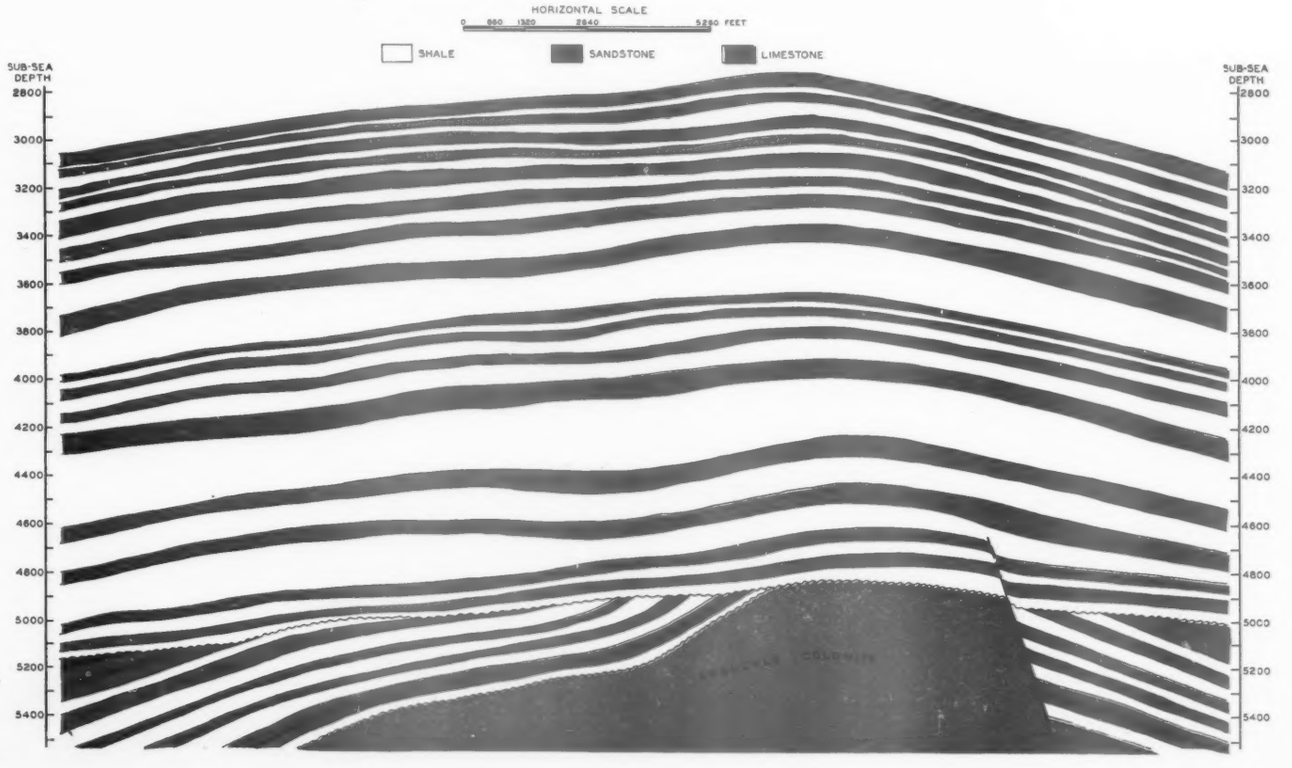
GEOLOGICAL HISTORY: The Oklahoma City field lies on an anticline which was formed over the granite of the Nemaha ridge, due to later uplift of the old high. This uplift came near the close of the Mississippian period and the structure was beveled off by erosion before being covered by the advancing Cherokee sea. The eastern flank of the anticline was faulted down and movements along the fault persisted after burial by the Lower Pennsylvanian section.

During the period of erosion, the Arbuckle limestone was exposed at the crest of the anticline and the beveled edges of higher formations surround the exposed Arbuckle core.

On burial beneath the Pennsylvanian sediments, differential movements continued with the result that the structure is reflected in outcropping Permian beds. Discovery was thus made by surface geology.

OIL-BEARING HORIZONS: The oil-bearing beds are divided into two groups. The more important lie below the major unconformity at the base of the Pennsylvanian and consist of the Arbuckle, Johnson, Hammar-Haindl, School Land, Wilcox and upper Simpson dolomite. With the exception of the Arbuckle, these pays are all members of the Simpson series. The pays are all separate, a fact which is demonstrated by the great variation in their behavior. The Arbuckle lime and two of the lower Simpson sands were subjected to a strong water drive which resulted in rapid depletion. The Johnson sand also produces much water but is long-lived.

The Wilcox sand is one of the most permeable sand bodies known. It was anticipated that this formation would be rapidly flooded but water encroachment has been negligible. As the pressure has declined, oil has flowed downstructure towards the water level so that wells are being abandoned progressively from higher parts of the structure downward. The upper Simpson dolomite had some small



production in the north part of the field but was short-lived.

The higher pays in the Pennsylvanian are mainly gas pays with some oil in relatively small areas at various localities around the flanks of the structure. The oil is very different from the oil in the lower pays, indicating no connection between the two groups.

The effect of the fault on production is to limit it to the western side, except in a few small local sharp uplifts on the east side where good Wilcox production was obtained.

ORIGIN OF THE OIL: The origin of the oil in these structures is a matter of controversy. The fact that the Ordovician formations only carry oil if they are exposed at the unconformity indicates that the oil had a post-unconformity origin. This is particularly true of a permeable formation such as the Wilcox from which Ordovician oil would have escaped during the long period of erosion when the edge of the formation was exposed at the surface.

Whether the oil was squeezed out of the Cherokee shales as some suppose or was formed from organic matter which collected in the exposed porous rocks when they were buried beneath the Pennsylvanian sea is of only theoretical interest. The important fact is that where any porous formation, even granite, lies beneath deposits laid down in an advancing sea, that formation is a potential reservoir.

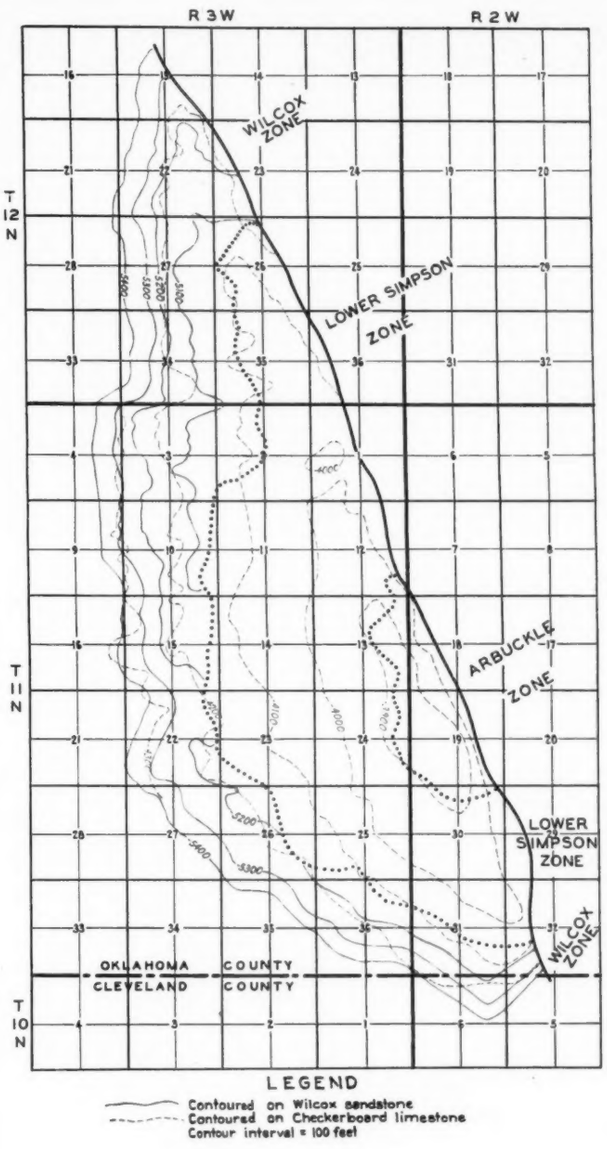
OTHER FIELDS OF THE SAME TYPE: More or less evenly spaced along the Nemaha ridge are similar fields of which Garber, Crescent, Edmond and Moore are examples. Similar "baldheaded" fields are found all along the Central Kansas uplift which extends in a northwesterly direction across western Kansas and into western Nebraska. The great Panhandle oil and gas field is a similar field.

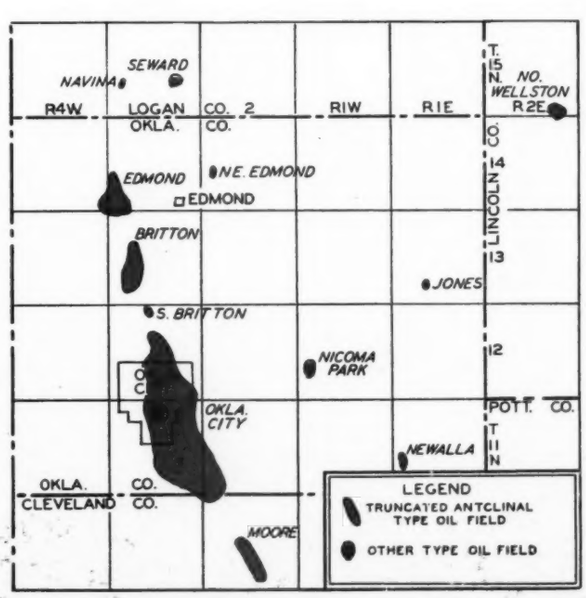
Current interest in Ellenburger production in West Texas and North Central Texas indicates that this feature is common to those areas and the sharp anticlines of the Red River Valley of both Texas and Oklahoma show great local thinning of Pennsylvanian formations where ridges of pre-Mississippian rocks project sharply upward. The recently discovered Apache field shows that these structures may be found in the Anadarko basin; thus the whole of the northern and western Mid-Continent area promises to be fertile ground for prospecting.

EXPLORATION METHODS: Since many of these deeply buried truncated folds are reflected by gentle folding or terracing at the surface, surface geology has been successfully used in locating fields of this type. Subsurface geology is somewhat difficult as it is necessary to treat the area as if the whole of the cover above the unconformity were removed. Recognition of the lower beds, often many miles from outcrops of these formations, makes correlation below the unconformity difficult. Where the overlying cover is not too variable, or contains no thick blanketing beds, seismic and gravimetric prospecting offer excellent possibilities. One factor of great importance is the rule that when an area is once uplifted, the chances are that subsequent movements will continue the uplift on very much the same axis. Thus, minor structural features found at shallow depths may show up strong and important structures below.

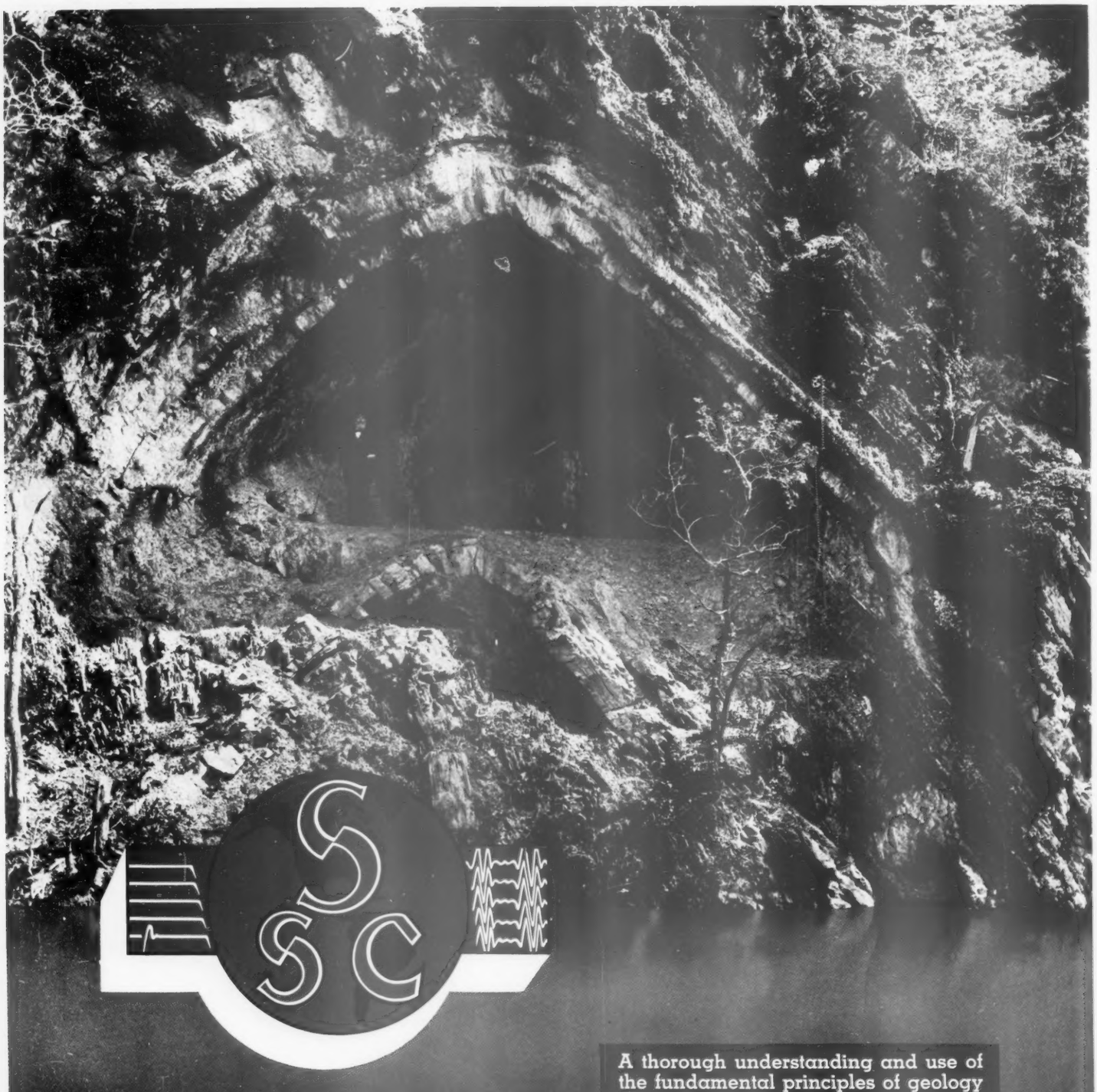
It must be pointed out that the crest of a truncated anticline is not always the most promising part. Oklahoma City provides an excellent example of this fact as wells drilled to the Arbuckle produced much smaller quantities of oil than Wilcox sand wells, of which many have yielded more than 1,000,000 bbl. of oil each on less than 5 acres.

Although faulting frequently appears on these structures, the effect of faulting on oil accumulation is negative in that the fault rarely forms a seal. The oil is found wherever a porous bed is overlain unconformably by an impervious bed capable of forming a seal. Hence if a potential reservoir is not penetrated by exploratory wells which find beds both above and below it, further testing down structure may find good production.





Left: East-west cross-section of Oklahoma City field. Right, above: Map of Oklahoma City field showing distribution of producing zones and contours on the Checkerboard limestone and Wilcox sand. Right, below: Key map showing location of Oklahoma City field. Principal references: U. S. Bureau of Mines, R.I. 3330, Engineering Report of Oklahoma City Oil Field, Oklahoma, and Geology and Development of Oklahoma City Field, by D. A. McGee and W. W. Clawson, Jr., A.A.P.G. Bulletin, Vol. 16, No. 10



A thorough understanding and use of the fundamental principles of geology and related sciences contribute to the consistent accuracy of SSC conducted seismic surveys.

Symmetrical anticlinal fold near Hancock, Md.

Photo courtesy of United States Geological Survey

Seismograph Service Corporation

valve (*D*). This valve is on the downstream side of a thermostatic compensated positive displacement meter (*E*), operating at separator pressure. Condensate discharged through this meter and valve is delivered into the gathering-system line downstream from the gas orifice meter. Thus, gas and condensate are both measured on the lease.

Condensate Separated From Gas

Well production, consisting of gas and condensate, moves through the field gathering lines (*F*) to the plant, where the two-phase mixture enters inlet separators (*G*) at approximately 350 lb. per sq. in. or greater. Here the gas and condensate are again separated and the gas flows through plant inlet orifice meters (*H*) to the base of the absorbers (*I*). The denuded gas flows from the top of the absorbers, through outlet scrubbers (*J*). The gas is metered (*K*) out of the plant and passes into the gas-transmission system through a pressure-control valve (*L*) which maintains the absorber and system pressure.

Condensate separated from the gas in the inlet separators, level of which is controlled by a kidney-operated valve (*M*) flows to a condensate surge tank (*N*), in which the pressure is reduced to and maintained at approximately 100 lb. per sq. in. by means of a back-pressure control valve (*O*). This flash gas then passes through a reabsorber in which any traces of recoverable hydrocarbons are removed. The function of this tank is to remove dissolved gas, settle out moisture, and to facilitate blending of the condensate from various wells, which vary slightly in their characteristics, ahead of the processing. The condensate flows from this tank, through a flow-meter controlled valve (*P*) under its own pressure into the processing plant.

By using this procedure, lease tanks with their attendant evaporation loss are eliminated. The condensate is delivered to the processing plant in the same lines the gas is moved in, thus eliminating separate transmission lines and pumps. Trucking of this condensate to the plant would be unsatisfactory because of the large amount of automotive equipment required and because of relative unreliability due to weather conditions. Many leases are inaccessible during the rainy months.

Upon delivery of the condensate to the plant the use of the inlet surge tank accomplishes a controlled pressure reduction to a predetermined pressure which removes all dry gas with a minimum loss of recoverable hydrocarbons. If the condensate were flashed from 400 lb. down to atmospheric pressure in a lease storage tank and allowed to weather for any length of time, as high as 15 per cent of recoverable hydrocarbons, consisting chiefly of butanes which are currently in great demand, would be lost. In addition to this volumetric loss, the gasoline produced would require larger quantities of tetraethyl lead, due to the fact that these light hydrocarbons increase the natural octane number of the motor fuel before leading. Butane, as such, is being produced and the loss of the hydrocarbons mentioned by weathering would sharply decrease the production of this material.

Through the measurement of condensate at the wells by accurate meters under approximately 400 lb. per sq. in. pressure, we recover those lighter hydrocarbons such as pentanes, isobutanes, etc., necessary to the present war effort.

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ABSTRACTS

of papers delivered before the American Gas Association meeting, New Orleans, La., May 4, 5, 6, and 7, 1942

RUNNING LINERS AND PRODUCTION OF GAS THROUGH LINERS IN THE PANHANDLE FIELD. C. I. Galloup, Field Superintendent, Texoma Natural Gas Co., Amarillo, Tex.

AFTER several years' experience with gas production in the Panhandle field, slotted liners set through the pay zone have become an essential part of this work. Before liners were used, the shales caved badly, reducing if not completely shutting off the lower pay section by bridging the hole above them. This condition required frequent cleaning out of the wells in order to maintain production.

The common practice in the Panhandle field is to set the liner on bottom and allow it to extend a few feet up into the "production string." The length of these liners depends on the particular area in which they are used, and may vary from a few joints to 700 ft. or more.

The first thing is to be absolutely certain that the hole is in good condition and full size, by running a full-dressed bit to bottom.

In the Panhandle field we commonly run several unperforated joints in a string. These joints are arranged in the string so as to cover the shale beds when the liner is set. Any caving of these shales then soon bridges on the first collar below the shale, and no more shale enters the well bore. This is a good argument for running liners that are as large in diameter as the well bore will safely permit. Large liners also permit deepening of the hole.

There are several methods of running these liners. The three most commonly used methods are:

1. Running liner on tubing.

2. Running liner on a string of pipe and unscrewing by means of a left-hand thread; then pulling the pipe.

3. Running liner on the drilling line and unhitching by means of a jack-knife pin.

We find that using the drilling line and jack-knife pin for setting the liner is the most satisfactory.

Field experience has proved that there is little or no greater hazard in running a liner in a 20 to 30 million cubic foot well than in running tools in the same well. In wells having an open flow in excess of 30 million cubic feet, it is wise to use some additional equipment to prevent the liner from blowing out as it is being made up. The most common device used in this work is a double spider with slips arranged to prevent movement of the pipe in either direction until the slips are released. In addition to using such a spider it is necessary to "snub" the pipe in the hole until such time as the weight of the liner overcomes the lifting action of the gas. With the use of such equipment, liners have been run on casing in wells having an open flow in excess of 100 million cubic feet.

The cleaning of liner perforations is becoming an important part of gas production in the Panhandle field. The slots sometimes become slightly restricted after several years' operation. A very satisfactory tool can be made by drilling $\frac{5}{8}$-in. holes through a 10-ft. length of $3\frac{1}{2}$-in. drilling stem and securing short pieces of $\frac{5}{8}$-in. sand line in these holes. These sand-line fingers are made about $\frac{3}{4}$-in. longer than the diameter of the liner to be cleaned.

Two loops of $\frac{1}{4}$-in. rod welded at the quarter points on the circumference of the shoe forming a ball-type cage serve very satisfactorily as a guide.

It is of interest to note that a liner in a Panhandle gas well does not affect the open flow. Well testers using the back-pressure method report a more satisfactory check can be obtained on their work when the well has a liner in it.

•

REMEDIAL WORK IN CONNECTION WITH PRODUCTION METHODS. J. H. Isherwood, Vice President and General Manager, North Penn Gas Co. and Affiliated Companies, Port Allegany, Pa.

CONDITIONS have placed a greater burden on the old shallow gas fields in the eastern United States. The principal method of increasing the productivity of these wells is through remedial work. By comparing cost per well per year to data obtained from flow tests, those wells needing prompt maintenance or remedial work can be determined. Opening of deeper or shallower zones, shooting or reshooting, new pipe, new packers, new tubing, drilling of pockets for the accumulation of water, bailing of wells, pumping wells and blowing of wells may all be used to increase the production.

The author then presents specific examples of jobs done to increase the productivity of gas wells. Equipment used is also described.

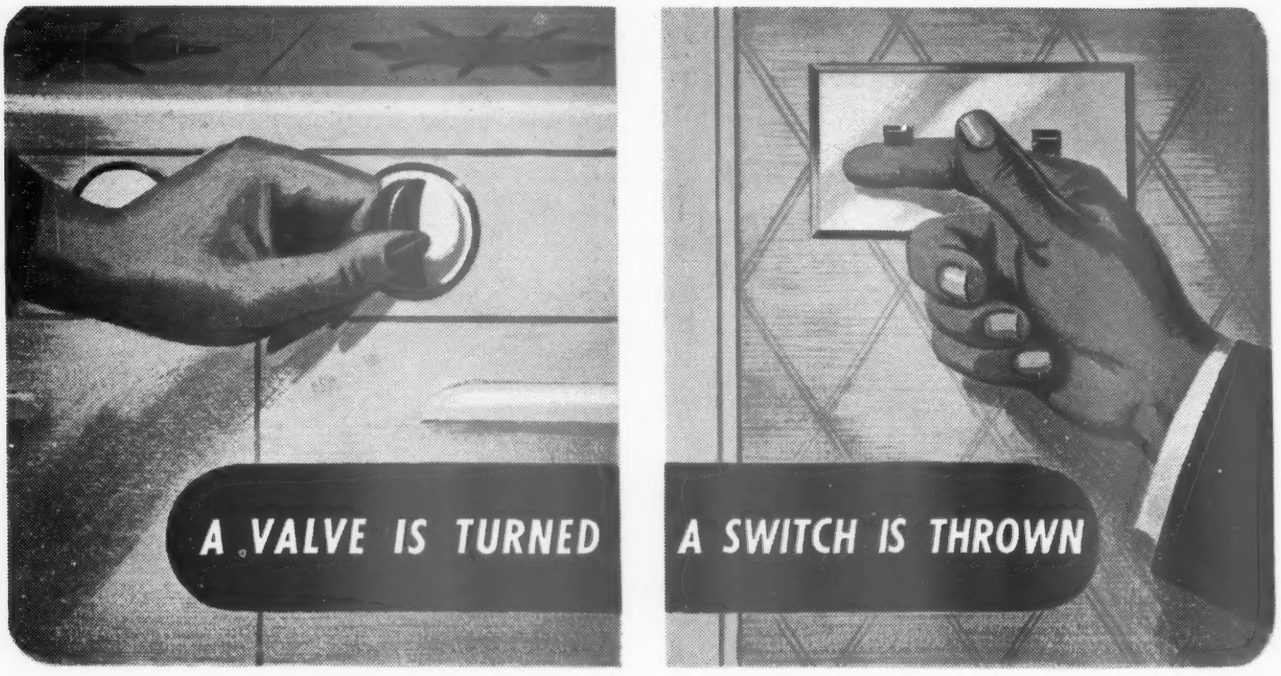
•

MECHANICAL SUBSURFACE EQUIPMENT FOR PROTECTING OIL AND GAS WELLS AGAINST SABOTAGE AND BOMBING. John O. Farmer, Otis Pressure Control, Inc., Dallas, Tex.

EXTENSIVE and successful enemy submarine activity and occasional aerial reconnaissance flights around our shores during the last few months have rocked the complacency of the most conservative oil operators. Precautionary measures to safeguard petroleum reserves against attacks have been extensive in some areas but lax and somewhat slow in other areas.

The extent of damage caused by a general and well-planned attack is problematical; however, it is not difficult to foresee the chaos and disaster that would be caused by 20 "wild" wells at one time in this area. The loss in ultimate income to the operators would be terrific; but, the loss of the oil to our war program would be many times more critical. It is generally agreed by most operators that sandbagging alone does not provide adequate protection. Therefore, it is imperative that safety devices of a positive or automatic nature be placed several hundred feet below the surface where their mechanism cannot be rendered useless by bomb impact or the pilfering hands of fifth columnists.

Casing packers loaded above with mud give positive protection of the annular space. However, for two-zone producers, annular space safety valves are now available that permit flow through the annulus up to a predetermined rate but which instantly plugs this area when this rate is exceeded. Automatic tubing safety valves have been



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used quite extensively for some time for marine completions. Two general types of these valves are in use—the Type B which operates by flow velocity and the new Type C which is actuated by pressure differential. Both types plug the tubing when a predetermined maximum rate of flow is reached; however, the later Type C is gaining greater favor primarily because it will not close prematurely due to the hard surging flow. It is the writer's firm conviction that our high-pressure reservoirs can be best protected against uncontrolled flow by consistent and well-planned usage of subsurface control devices.

●

ADJUSTMENT MECHANICS OF A TIN DIAPHRAGM METER. A. V. Brashear, Superintendent of Meters, Michigan Consolidated Gas Co., Detroit, Mich.

THE variation in proof from the adjustment setting found in meters received from service led to a study of the diaphragm meter to determine the cause or causes for this change. This resulted in closer control of the repair operations of the rebuilding and adjusting of meters.

This paper outlines an easy way of understanding the adjusting moves which should be made and what can be expected in the way of a proof change after these moves have been made. The mechanical defects which influence or interfere with the application of the adjusting moves are also discussed.

●

ENGINE ADJUSTMENTS FOR WAR-TIME FUELS. C. E. Smith, Research Laboratories, Ethyl Gasoline Corp., Detroit, Mich.

CIVILIAN fuel has taken a secondary place in the present refining program and present day fuels are the best product a refiner can make after he has met the demands of the war effort. Civilian fuels are becaming less volatile and of lower octane number owing to:

1. Stripping of light ends to furnish aviation-fuel components.
2. Diversion of natural-gasoline components to aviation-fuel production.
3. Elimination of high-octane straightrun gasoline because of the need for it as an aviation base.
4. Elimination of polymer gasoline because the charging gases used in its production can also be used as charging material for the production of alkylate.
5. Reduction in the quantities of catalytically cracked gasoline available because it can be used as aviation base fuel after some reprocessing.
6. Curtailment of tetraethyl lead for civilian fuel.

●

THE OPERATING EXPERIENCE WITH AUTOMATIC CLOSING VALVES IN A NATURAL-GAS TRANSMISSION SYSTEM. D. C. Palm, Division Superintendent, Natural Gas Pipeline Co. of America, Chicago, Ill.

IT has long been the practice on pipe-line systems to use valves to isolate a section where a break has occurred. There is always a considerable lapse of time between the break and the shutoff, due to the necessity of mobilizing the organization which is set up for this emergency duty. A high-pressure valve assembly, closing automatically with a drop of pressure in the pipe line, has been developed in recent years and is now extensively installed on a long-distance large-diameter, high-pressure gas pipe-line system. It will close automatically in case of a break in the pipe line on either side of the valve and will remain closed until manually opened, yet the valve is not affected by normal line pressure fluctuations due to service demands. The valve can be manually operated independent of the automatic control mechanism in a manner similar to the operation of any conventional hand-operated main-line valve.

There are five factors which affect the speed at which an automatic valve setting responds to a certain pressure drop caused by a pipe-line break:

1. The amount of friction in the valve mechanism.
2. The radius of the gear segment.
3. The area of the piston.
4. The storage capacity of the reservoir.
5. The size of the orifice installed between the reservoir and the pipe line.

During an assumed break in the pipe line, at varying distances from an automatic valve setting, the rate of pressure drop at the valve setting will vary according to two variables:

1. The distance of the valve setting from the terminating point of the pipe line (i.e., compressor station or point of gas delivery).
2. The distance of the assumed break from the valve setting.

On a multiple-line river crossing consisting of six 12-in. pipe lines, automatic valves were installed between conventional valves already in place.

1. It was found that the automatic valves operated with a differential gas pressure of approximately 55 lb. across the piston.
2. If the valves were installed at approximately 10-mile intervals, calculations indicated that the valve nearest the pipe-line break would close not later than 2 minutes after the break occurred and if they were installed at approximately 20-mile intervals the time interval between the break and closing would not exceed 4 minutes.

●

DRILLING AND COMPLETION IN HIGH-PRESSURE AREAS. Frank E. Kendrick, Geologist, Lone Star Gas Co., Dallas, Tex.

NECESSITY for adequate drilling equipment while completing deep, high-pressure gas wells has led to the adoption of rotary-drilling rigs for this work. The use of a satisfactory and properly designed mud is the most important factor in this work. In areas of normal pressure a density of 75 lb. per cu. ft. or 10 lb. per gal. is sufficient providing it contains adequate colloidal material. Abnormal pressures require greater weight in the mud.

Proper viscosity and gel strength characteristics are important to prevent gas entrainment and consequent blowouts. The filtrate characteristic and the wall-building properties are also important to prevent infiltration into the sand and to prevent wetting of caving shales.

Ample surface casing adequately cemented is necessary to supply an anchorage for the blowout equipment.

Mud logging provides a method of determining the porosity of formations drilled and a gage of their content. These portable laboratories are particularly suited to detecting gas showings which can be tested. Also, early detection of gas will prevent blowouts. The rate of penetration recorder alone will give a good indication of the porosity of the formation; drilling can then be suspended and circulation continued until the portion of the mud passing through the bit at the time the porous zone was drilled can be checked for its content.

Care should be taken while coring to insure maximum recovery of the zones to be examined. Core analysis at the wells insures more accurate results. Electric logging is also a valuable aid in predicting production possibilities.

Setting the production string through the pay zones and then gun perforating has a number of advantages. "Caliper logging" can also be used to advantage to determine how much cement is needed to protect the pipe.

●

REMEDIAL WORK ON GAS WELLS AS PRACTICED IN TEXAS PANHANDLE. L. M. Batten, Cities Service Gas Co., Pampa, Tex.

THIS paper discusses some of the factors that prevent maximum recovery of gas from existing wells and presents certain methods of remedying these conditions. These methods to be discussed are common in the Texas Panhandle district and may possibly be applicable to other areas.

The Panhandle gas field has a subnormal rock pressure due to the fact that the producing formation lacks the hydrostatic head common in most producing areas. Producing formations are normally free from water, allowing for heavier withdrawals without the danger of encroaching water.

Factors that stand in the way of maximum recovery of gas are: (1) Improper completion practices, (2) deterioration of equipment, (3) improper operating practices, and (4) abnormal declines.

It has proven advisable to set casing at a point near the top of the pay section.

There have been failures of cementing jobs, resulting in a loss of gas from the formation. Enough cement should be used so that the top of the cement between the hole and the casing should extend between 800 and 900 ft. above the casing seat.

Analysis of water encountered in the Panhandle area indicates that corrosion from that source is slight. The principal cause of deterioration of well casing in the area can be traced to electrolytic action and while some current is generated within the well itself, it has found that electrolysis comes principally from connected pipe lines. This situation has been satisfactorily remedied by insulating the well casing from the pipe-line system. The preferred method for repairing casing in most wells is the running of an inner string of casing and cementing it near the top of the pay section with adequate cement. Another method—cleaning out the well and installing tubing packer may suffice for small-volume wells, or installing tubing as a bleeder string may be advisable.

For the work of running an inner string of casing, it has been found advisable to erect a standard drilling derrick and to use standard drilling equipment rather than lighter, portable drilling units.

To protect the pay formation, a thick mud slurry should be mixed and enough of this slurry pumped into the well to cover the entire pay section. Twenty-five per cent, by volume, of the solids contained in the mud slurry should be lime dust, so that in case there is a penetration of the slurry into the pay formation it will be susceptible to disintegration by acid treatment. Water may be pumped in on top to offset the formation pressure. Care should be taken not to apply an excessive hydrostatic head. With the mud-water column at rest, a firm cement bridge should be set just above the pay horizon. An adequate amount of cement as well as necessary precautions should be used to insure against channeling or loss of cement in porous formations and allowance should be made for enlargement of the original hole due to caving of the walls.

To drill out the bridge and clean out the well to its original depth, it is advisable to dress tools to the full size of the inside diameter of the pipe.

If 3-in. tubing is run with an anchor packer, a 4-in. anchor is recommended. This will allow for

adequate perforations in the anchor without weakening it below the 3-in. tubing strength.

It is possible to remove shale bridges and shale cavings from a well by running a fishtail bit on tubing and rotating it when bridges are encountered, at the same time alternately pumping in water and releasing pressure on the tubing to allow cuttings to be vented through tubing.

Working pressure on a well should be observed and when the pressure indicates condensates in the bore hole, the well should be vented—but only long enough to clean the well of its head of fluid. If the well is to be shut in for repair or for proration reasons, condensate should be blown out when the well is shut in if there are indications accumulations are present.

Wells with an excessive decline in open flow as compared to the decline in rock pressure respond very satisfactorily to acid treatment.

The following data compiled on seven wells treated illustrates this point. The wells had all been producing 10 years or more.

Original combined open flow of the wells was	135,866 M.c.f. daily
Combined open flow at time of treatment was	55,926 M.c.f. daily
Representing a decline of	79,940 M.c.f. daily
or 58.8 per cent of the original open flow	
Original rock pressure averaged	418 lb. per sq. in.
Rock pressure at time of acidization averaged	310 lb. per sq. in.
showing an average decline of 108 lb. per sq. in. or 25.8 per cent of the original	

The wells were treated with an average of 10,660 gal. of 15 per cent hydrochloric acid. The open flow after acidization of the seven wells totaled 151,593,000 cu. ft. This is an increase of 171 per cent of the open flow at the time of treatment and 11.6 per cent greater than the original open flow.

●

DRILLING-MUD PROBLEMS ON DEEP WELLS. C. A. Sullins, Union Producing Co., Shreveport, La.

HOW problems of drilling heaving shale, deep anhydrite and deep lime horizons were solved are explained in this paper. A 5,000-ft. interval of heaving shale from 8,750 to 13,728 ft. was successfully drilled in the Union Producing Co. 1 Brown, Aqua Dulce field, Nueces County, Texas.

At 9,613 ft. a sodium silicate-salt water drilling fluid was used to replace the regular mud in the hole. The sodium silicate mud required some special treatment, including an 80-mesh screen in addition to the regular screen. When the final depth was reached the mud had the following characteristics: Weight, 13.2 lb. per gal.; funnel viscosity (1,500 cc. in, 500 cc. out), 31 seconds; flow-pipe temperature, 138° F.; Stormer viscosity, 57 centipoises; gel strength, 74 g.; volumetric analysis of liquid phase, 59.8 per cent silicate and 27.4 per cent saturated salt solutions; filtration characteristics, 22.5 cc. of filtrate and a cake thickness of 5/32 in 30 minutes at 100 lb. pressure.

Sodium tannate was used to prevent a too thick filter cake on the porous sands and gravels in the Union Producing Co. 1 Waite, Clarke County, Alabama. By using 25 lb. of quebracho and 5 lb. of caustic per barrel of water, the water loss was cut to 13 cc. and the filter cake to 3/32 in. Anhydrite encountered below 11,860 ft. was one of the factors causing flocculation. By treating the mud with the caustic quebracho and sodium tetraphosphate the viscosity was reduced to where the mud flowed freely and the water loss and filter cake were quite low.

Drilling of the Smackover lime from 11,884 to 12,502 ft. in the Union Producing Co. 1 McDonald in the Lisbon field, Claiborne Parish, Louisiana, a blowout was prevented by increasing the mud weight from 10.4 to 13.5 lb. per gal. The mud did develop an excessive gel strength which was partially overcome by the use of complex phosphates. It is believed that the sulfide gas in the lime gave an acidic quality to the mud which caused it to gel. The bottom-hole temperature was also excessive being in the neighborhood of 300° F.

●

SOME FACTORS AFFECTING MUD CONTROL AND COMPLETIONS IN THE CHICKASHA FIELD. Arnold F. Parr, Oklahoma Natural Gas Co., Tulsa.

MOST of the early mud troubles in the Chickasha gas fields were caused by using water from the Little Washita River which contained considerable gypsum anhydride. The mud flocculated causing an excessive filter cake and a high gel strength. Caustic quebracho was used to lower the gel strength and reduce the viscosity. The water loss should be kept below 20 cc. at 100-lb. per sq. in. pressure and 30 minutes in a filter press; this prevents wetting of the shales which leads to sloughing.

Well water, free from anhydrites, reduced part of the trouble, but it was necessary to use phosphates to control the water loss and filtrate.

Most wells at Chickasha have a hydrostatic head due to the mud column of 400 to 500 lb. in excess of the bottom-hole pressure. Due to the steep dip, the depth from the surface to the pay formation varies widely. In a well high on structure it was necessary to keep 12.5-lb. per gal. mud to maintain the required safety margin while in another well, low on structure, it was only necessary to have mud weighing 9.4 lb. per gal. However, the structure is steep and an adequate safety margin is maintained in case the well is higher than expected.

Mud logging was used extensively by the author's company in the field to obtain information prior to running electric logs and to supplement information obtained by the latter method.

●

RECONDITIONING STEEL MAINS IN DETROIT. R. B. Allen, Michigan Consolidated Gas Co.

THIS company has, for some years, been giving careful consideration to the problem of maintenance of uncoated steel pipe.

Originally we had maintained the system by making spot repairs, but as the rate of failure advanced this practice was discontinued in favor of a program of replacement with coated and wrapped pipe. This in turn gave way to a program of reconditioning mains rather than replacing them.

In 1940 we selected a 1,400-ft. section of 8-in. main, where we had previously experienced some maintenance, and on which surveys had indicated the existence of additional leakage, for a trial reconditioning job. The main was exposed and cleaned. Pits deeper than two-thirds of the pipe-wall thickness were filled with welding rod and the pipe was then coated and wrapped. This work was done without any interruption of service.

There is on the market a stripper bucket which in cross-section is reversed from the conventional excavating bucket and which is designed to fit a small wheel-type trenching machine and will excavate a trench 22 in. wide. The reverse design of the bucket permits of cleanly excavating over the top of the main and the rooters on the side of the buckets loosen and partially remove the dirt from the side of the main.

When a minimum of 150 to 200 ft. of main was exposed, the main was raised with level-type chain hoists and blocked at 40-ft. intervals 12 in. above the trench bottom.

The soil condition in at least a portion of the area formed a scale which was particularly difficult to remove. We became interested in the possibilities of flame cleaning and experiments made with an acetylene flame resulted in a pipe surface which was not only free of scale, but was dehydrated and in excellent condition for coating. We decided to experiment with a burner head, using natural gas for fuel.

The average rate of pipe cleaning was approximately 60 ft. per hour. The pipe was wire-brushed by hand to remove dust and at the same time inspected for pits and any possible remaining shale. The moisture-free surface of the pipe as left by the flame cleaner presented an ideal condition for coating.

Any leaks found were repaired by welding on patches or tapered plugs. Clamps or saddles covering previous leaks were removed and the leaks repaired in a like manner. All services and laterals tied into the main with saddles were reconnected with welding tees. We found the total cost of repairing leaks and filling large pits to average approximately 1 cent per foot, a small item when compared with the total cost of reconditioning.

The first coating application consisted of a primer which was mopped onto the pipe. This was followed by a cold application of coating material hand-applied and rubbed well into the surface of the pipe, leaving a layer of approximately $\frac{1}{16}$ in. of material on the pipe. This was covered with a 5-in. width wrapper spirally applied and a final coating of material applied at a temperature of 400° F., flooded and hand-rubbed onto the pipe.

We considered it advisable to make provisions for future testing of the continuity of the coating. For this purpose, test leads consisting of a 6-in. length of No. 8 rubber-covered wire, welded to the main with the other end terminating in a 6-in. roadway box, were installed at 2,000-ft. intervals.

It is doubtful that there would normally be any justification for reconditioning 2-in. mains, but a savings of from 25 to 50 per cent can be obtained on 4 to 8-in. sizes. The labor and material involved in the actual coating of pipe amounts to approximately 30 per cent of the total reconditioning cost and is chargeable to capital accounts.

●

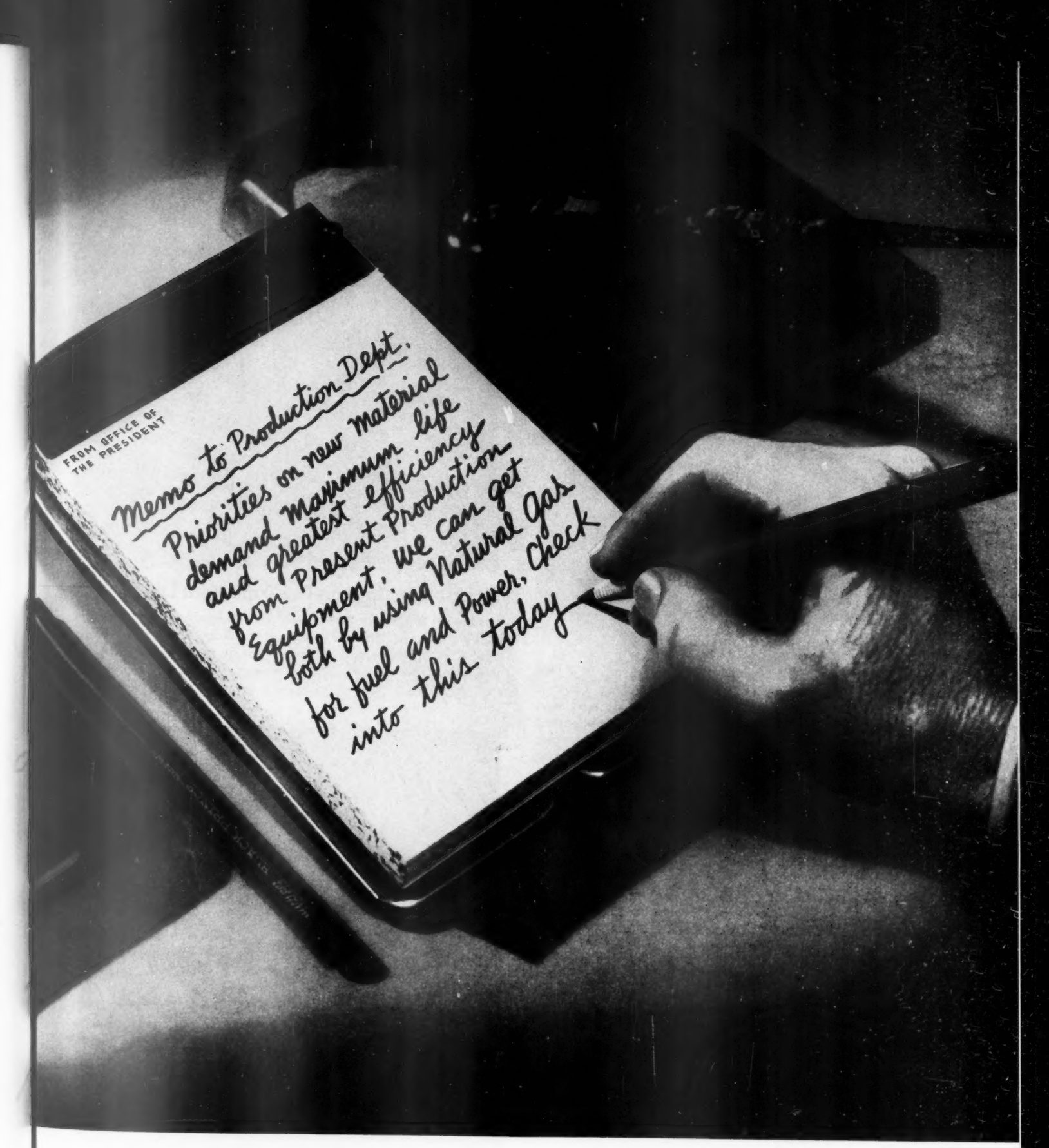
EXPERIENCES WITH CATHODIC PROTECTION. C. R. Olson, United Gas Pipe Line Co., Shreveport, La.

THE author gives a nontechnical summary of cathodic-protection projects with which he has been connected over the past 11 years. This includes the basic design of the first units installed and the operating difficulties and the results obtained with them up to the modern units designed to protect coated and uncoated lines.

At the present time cathodic-protection equipment on the gas-transmission systems under the author's supervision includes 424 rectifiers, 69 gas engines, 93 windmills, and 1 motor-generator unit, a total of 587 units. These units are providing full protection to about 514 miles of pipe line or 2,268 miles of 3-in. equivalent. No definite figures on the degree of corrosion control obtained are available but leak records indicate that, with adequate maintenance to insure 90 per cent operation of the protection equipment, the life of the lines will be prolonged indefinitely.

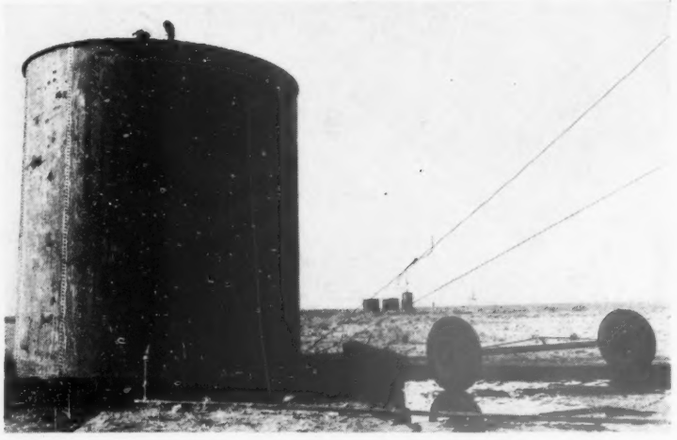
These units are also supplying partial protection to about 192 miles of pipe or 865 miles of 3-in. equivalent. By partial protection is meant that the density of the current drained is less than 0.3-volt pipe-to-soil potential; leak records show that corrosion is being substantially retarded.

It is pointed out that much remains to be learned about pipe-to-soil potential and/or current density requirements for full protection. Field instruments are used as a guide in making output adjustments but the final criterion is the corrosion-leak record.



OKLAHOMA NATURAL
Gas Company

Operating Ideas



Service Tank Moved on Wheels

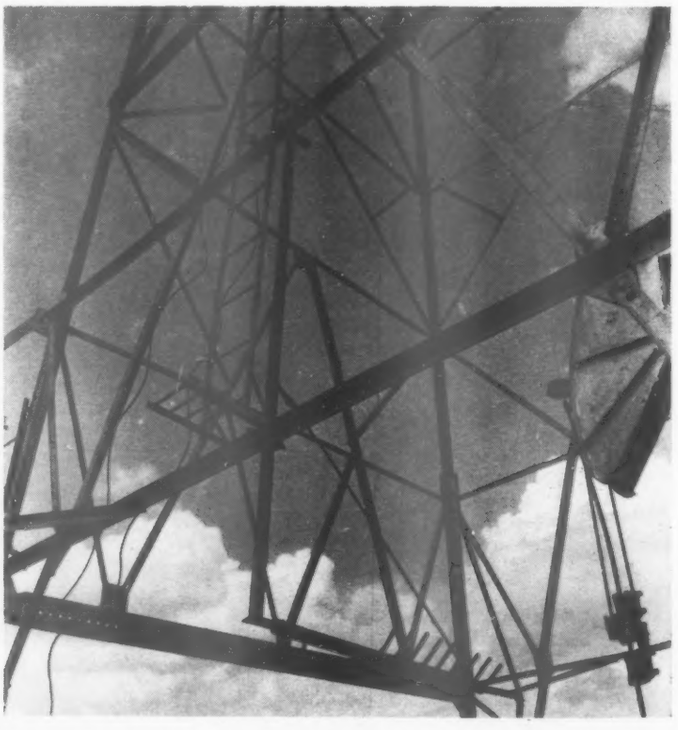
Skidding of temporary service tanks from well to well in a field subjects them to stresses and possible accidental injury that may necessitate excessive repairs, and shorten their lives of usefulness. Instead of being skidded, this 500-bbl. tank used for well-testing purposes in a West Texas field is transported by means of a pair of wheels. The wheels have 12-in. by 22-in. tires and are spaced to permit the tank to ride on the supporting axle between them. The tank is mounted on a timber platform which is moved as a supporting base with the tank. For a move, the platform, with the tank empty, is raised and the wheels run under one end of the tank platform. The other end of the platform is supported by the truck which moves the tank. Permanent fittings are on the tank, making connection work simple.

Sucker-Rod "Wagon" For Well Servicing

A complete string of sucker rods can be accommodated on this rod wagon which can be moved easily as desired. The rods are laid down in this wagon as pulled from the well and kept laid out straight in an orderly pile until rerun in the well. The wagon is a simple means of transporting rods to location without damage.

Double-Leg Support For Tank Vent Line

Double-leg support for tank battery vent line provides extra rigidity and support, reducing the chance of breakage and possible damage. It also serves as a ladder to provide ready accessibility to the relief valve at the top. The legs are embedded in concrete.



Rod Hanger Prevents Bending and Kinking

A simple rod hanger designed to prevent bending and kinking of rods pulled from the well is provided in this derrick. It consists of a series of separating fingers welded onto a main body member hung from a girt of the derrick at one side at the desired elevation. The rods can be slipped easily and quickly between the fingers where they are supported.

BLOWOUTS THAT Didn't HAPPEN

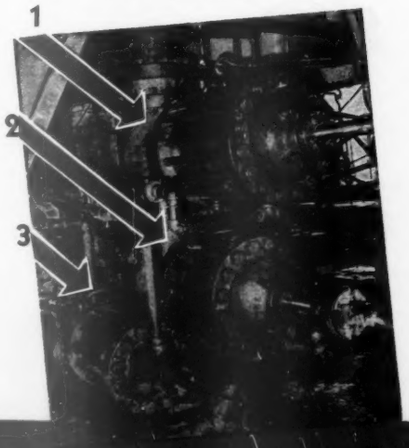
TEXAS GULF COAST
Crosby Area Test Resuming After Attempted Blowout
By F. L. SINGLETON
SOUTHWEST TEXAS
Two Attempted Blowouts in Test Southwest of Alice
By F. L. SINGLETON
LOUISIANA GULF COAST
Test on East Flank, Old Avery Dome, Attempts Blowout
By F. L. SINGLETON
LOUISIANA GULF COAST
Tepetate Outpost Attempts Blowout From Deep Sand
By F. L. SINGLETON
TEXAS GULF COAST
Crosby, Harris County, Test Has Second Blowout Attempt
By NEIL WILLIAMS

HAVE MADE CAMERON CONTROL UNITS *FAMOUS!*

The wells that "attempt" to blow out . . . and don't . . . are usually the wells that are *adequately Cameronized*, i.e., the wells that are equipped with Cameron Control Units of ample capacity to control the pressures that can be anticipated at a given depth. Our records indicate that no operator, whose rigs are equipped with Cameron Pressure-Operated Control Units of the *recommended test pressure*, has suffered a major blowout due to failure of that control equipment.

It is an established fact that pressures below 7000′ may exceed 3000-lbs. So, as a means of preventing blowouts, thus conserving irreplaceable reservoir pressures and preventing the loss of valuable equipment, operators are urged to replace obsolete and inefficient control equipment with Cameron Control Units of *adequate capacity*—3000-lb. test for depths to 7000′; 6000-lb. test for depths exceeding 7000′.

CAMERON—first in the oil tool industry to receive the Navy "E" for ordnance production.



These and Numerous Other Mechanical Features Make Cameron Pressure-Operated Drilling Control Units The Choice of Most Operators Everywhere:

1. *Patented Self-Feeding Blowout Preventer Ram Packing Element*—Makes positive shut-off and permits pipe movement under pressure. Gate Valve ram gate is also equipped with Self-Feeding Packing Element.
2. *Fluid Pressure-Operated*—Blowout Preventers and Gate Valves opened and closed by fluid pressure provided by boiler feed pumps or slush pumps. (Manual Control optional.)
3. *Fast Closure*—Keeps mud in hole to assist in controlling well pressure.
4. *Enclosed Fluid Pressure System*—Gas pressure blowing up under derrick floor cannot affect closure of preventers.
5. *High Closing Ratio*—For example, 500 lbs. closing pressure holds 1500 to 2000 lbs. well pressure.
6. *Remote Control*—4-way valves within easy reach of driller eliminates danger to crew and inspires confidence.
7. *Rams Automatically Center Pipe in Hole*—Extremely heavy wing guides on rams center pipe in hole and cannot be bent or fouled, thus assuring complete closure.

CAMERON IRON WORKS, INC.

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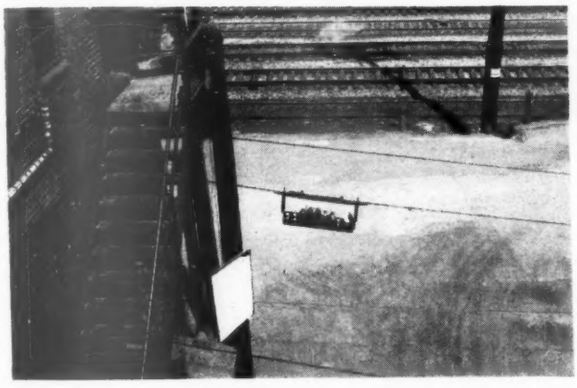
EXPORT: 74 Trinity Place, New York, N. Y. OKLAHOMA: Paul Edkin, Tulsa
CALIFORNIA: The Howard Supply Co., Los Angeles
ROCKY MOUNTAIN: Mountain Sales & Service, Casper, Wyo.

BETTER PERFORMANCE THROUGH
Selective Cementing ★
PLENTY in time . . . not too little too late—that is what today's drilling program means. More important than ever to *select cement to fit the job.* These jobs presented two different problems . . . Lone Star had the right cement for each:
'STARCOR' SELECTED FOR EMERGENCY JOB Rosenberg Field, 180° F. temperature. Unpredictable blow-out and subsequent developments necessitated cementing drill-pipe in hole, a very difficult operation, requiring easy-flowing cement for proper placing. 'Starcor' selected for the job and 570 sacks, slurry weight 16.5 lbs. per gallon, were pumped through drill pipe in 35 minutes; maximum pump pressure 1500 lbs. Strong, dense, trouble-free shut-off.
'INCOR' SELECTED: Hull Silk Pool Field . . . 4292' of 5½" OD pipe in 9" hole; temperature, moderate; 250 sacks 'Incor', slurry weight 16 lbs. per gal., pumped down in 11 min.; 700 lb. max. pump pressure to land plug on float-collar. Early drill-out, well on production quicker.
Use 'Starcor'* for deep wells . . .'Incor'* for moderate-depth wells. For highest temperatures and pressures, use 'Texcor'† —extra slow setting, longer pumpability, high strengths, great density. Lone Star's four oil-field cements meet the entire range of cementing conditions. Select cement to fit the job.
*Reg. U. S. Pat. Off. †Trade Mark
SYMBOL OF QUALITY
LONE STAR CEMENT CORPORATION
EVER SINCE 1900
★ SELECT CEMENT TO FIT THE JOB
OIL-WELL CEMENT
HIGH EARLY STRENGTH PORTLAND CEMENT
PORTLAND CEMENT
'TEXCOR' for deepest wells. Extra slow setting, longer and easier pumpability at highest temperatures . . . higher strengths.
'STARCOR' for deep wells. Slow setting; pumps easily at high temperatures. 6 years' successful performance in deep, hot holes.
'INCOR' for wells of moderate depth. Earlier drill out, wells on production quicker. 15 years' outstanding performance.
LONE STAR for all around use, above ground and elsewhere. Portland Cement of outstanding quality ever since 1900.
LONE STAR CEMENT CORPORATION
DALLAS
'Starcor' . . . 'Incor' . . . Reg. U. S. Pat. Off.
HOUSTON

Refinery IDEAS

. . . that save $ $ $

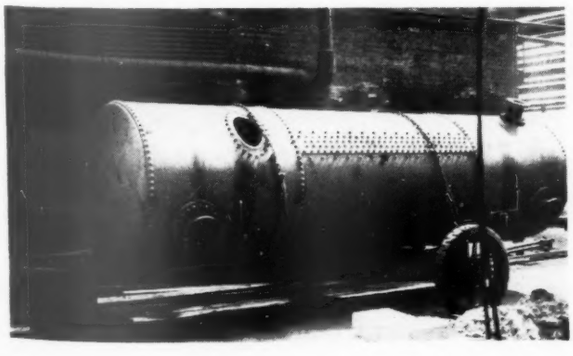
Conveyor Carries Samples and Reports Between Laboratory and Stills

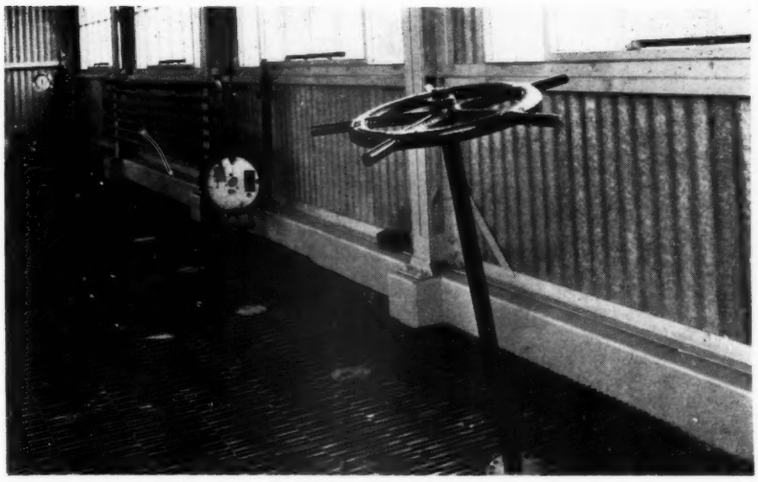


In order to facilitate the delivery of samples from the stills to the laboratory, a western Pennsylvania refinery has installed the conveyor pictured here. It is suspended from an endless cable and is powered by a ½-hp. electric motor. When the conveyor enters an aperture in the wall of the laboratory it strikes a switch, shutting off the power. The conveyor has compartments for eight samples and another for a paper carrying the results of tests.

Heavy-Duty Truck For Inside Plant

The truck shown here was built expressly for the job of transporting large vessels. The body consists of a welded triangle of I beams. Axles from a junked truck equipped with solid rubber tires were welded to the corners at the base of the triangle. A heavy section of pipe runs through the apex of the triangle to the base. A longer section of smaller diameter pipe inside the other allows the length of the truck to be adjusted to the length of the vessel. A pin which may be inserted in holes spaced at intervals in the smaller pipe holds extension in place.



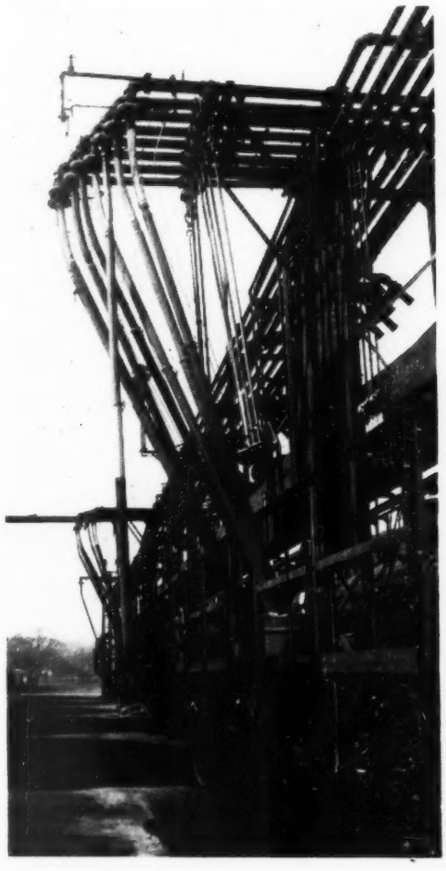


No Tampering With Valves When Extension Removed

In a refinery manifold where large lines are in service it has been found to be safer and more convenient to install the valves below the floor level of the pump-house control room and to provide only one valve-stem extension. In this manner the position of each valve cannot be easily tampered with and economy of space will result. In the picture is shown such an installation. The row of buttons on the floor indicates the location of a row of valves underneath. Any one of these valves can be reached or changed by the extension and handle shown at the right. This may be done by removing the button from the socket and inserting the extension through the hole provided in the grating. The nature of the connection between the extension and the valve stem can vary, but obviously the part that is attached to extension for making this connection must be of small diameter.

Overhead Truck Loading Rack Cuts Evaporation

These loading-rack pipes were made and installed by the refinery which uses them. The body from the flexible connection to the discharge end is made of 2½-in. diameter, 16-gage steel pipe. A sleeve covers the lower end of the pipe below a welded collar. When a truck is being loaded the sleeve is lowered to a point a few inches above the bottom of the tank. This minimizes turbulence and, consequently, decreases evaporation losses. The sleeves are counterweighted so they may be easily withdrawn from the tank. The pipes are painted different colors to indicate different products. The extension stem on each valve may be plainly seen and this enables the truck operator to stop the flow of product within a few gallons of any desired quantity to be loaded.



Progress in METALS

By W. L. NELSON

Machinability Ratings And Cutting Fluids

THE Independent Research Committee on Cutting Fluids of the American Society of Metals has adopted machinability ratings for various metals. Their conclusions are summarized in Table 1, but it should be borne in mind that the table must be a compromise between many divergent views. Table 2 indicates the types of cutting fluids that are recommended for various metal-working operations in terms of the machinability ratings. The table is intended only as a guide to the shop practice that was observed by the committee.

The machinability ratings (Table 1) indicate the ease of conducting machining operations, i.e., a rating of 100 per cent indicates that the material can be handled with the same ease as an S.A.E. 1112 (bessemer screw stock) steel whereas a rating of 50 per cent indicates a material that can be machined with only half the ease (twice the difficulty) of S.A.E. 1112, or a rating of 200 per cent indicates an extreme ease of machining of twice as easy to machine as S.A.E. 1112. Note that S.A.E. 1112 screw stock can be machined with more ease than any other common steel product. The ratings (Table 1) are based on cold-drawn steels. Metals in the hot-rolled condition are usually more easily machined than cold-drawn materials and quenched and tempered steels are machined with difficulty. The Brinell numbers in Table 1 indicate the degree of hardness that is desired by most operators.

The symbols used for cutting fluids in Table 2 are as follows:

Em	Emulsifiable or soluble oils and compounds
Sulf	Sulfurized oils
MO	Mineral oils
ML	Mineral-lard oils
L	Lard oil
K	Kerosene
Dry	No cutting fluid

Sulfurized oils have a tendency to stain some nonferrous metals such as copper or copper-base alloys. In machining aluminum the cutting fluids are sometimes diluted with kerosene. Although magnesium alloys are usually machined dry, mineral seal oil is used in some operations. Water or emulsions should not be used for magnesium alloys. In general, mineral-lard and sulfurized (low per cent sulfur) oil mixtures are interchangeable.

TABLE 1—MACHINABILITY RATINGS

Ferrous Metals

S.A.E.—	Per cent	Brinell
Class No. 1 (70 per cent or over):		
1122	100	178-228
X1112	135	178-228
1120	80	143-179
X1315	85	143-179
X1335	70	187-229
X1020	75	159-192
4120	70	179-223
6115	70	179-223
Mall-iron	75-150	
Class No. 2 (50 to 70 per cent):		
1020	65	134-166
1030	70	170-212
1040	60	179-228
X1040	70	179-228
2315	55	174-217
3130*	55	179-217
3140*	55	187-228
4130*	65	187-228
4615	60	174-217
4640*	55	187-235
4815	65	187-228
5120	60	170-212
Stainless iron F.C.	60	160-217
Class No. 3 (40 to 50 per cent):		
1010	50	131-170
1050*	50	179-228
2330*	50	179-217
2340*	50	184-235
3115	50	174-217
3220	50	179-228
3230*	45	184-235
4140*	50	184-235
4150*	45	196-235
5140*	45	187-228
6130*	50	179-217
6140*	40	187-228
T1330*	50	179-217
T1340*	40	187-228
9260*	45	196-241
Ingot iron	50	101-131
Wrought iron	50	101-131
Stainless 18-8 F.M.	45	179-212
Cast iron	...	.....
Class No. 4 (below 40 per cent):		
2350*	35	196-235
2515	30	179-228
3240*	40	184-235
52100†	30	184-217
Ni-resist	30	.....
Stainless 18-8 austenitic*	30	.....
Steel manganese, oil-hardening*	35	.....
Tool steel, low tungsten chromium*	25	.....
Carbon tool steels*	30	.....
High-speed steel*	25	.....
Steel, high carbon, high chromium*	20	.....

Nonferrous Metals

Class No. 5 (100 per cent or more):		
Dow metal	200	.....
Manganesium and alloys	200-500	.....
Aluminum 11-S	200-500	.....
Aluminum 2-S	100-300	.....
Aluminum 17-S	100-300	.....
Brass, leaded F.C.C.D.	150	.....
Brass, yellow	100	.....
Brass, red	100	.....
Bronze, leaded bearing	100	.....
Zinc	200	.....

Note 1: The prefix "X" is used in numerous instances to denote variations in the range of elements.

Note 2: The prefix "T" is used with the manganese steels (1300 series) to avoid confusion with steels of somewhat different manganese range that have been identified by the same numerals, but without the prefix. (Discontinued in 1941.)

Note 3: The relative machinability of the metals classified is based on a factor of 100 per cent for cold-drawn S.A.E. 1112 steel (bessemer screw stock). For example, a metal with a machinability rating of 50 per cent would have one-half the machinability of cold-drawn S.A.E. 1112 steel, or would be twice as difficult to machine.

Note 4: *Annealed. †Spheroidized annealed. Note the terms "annealed" and "spheroidized annealed" refer specifically to the commercial practice in steel mills, prior to cold drawing, in the production of the steels specifically mentioned.

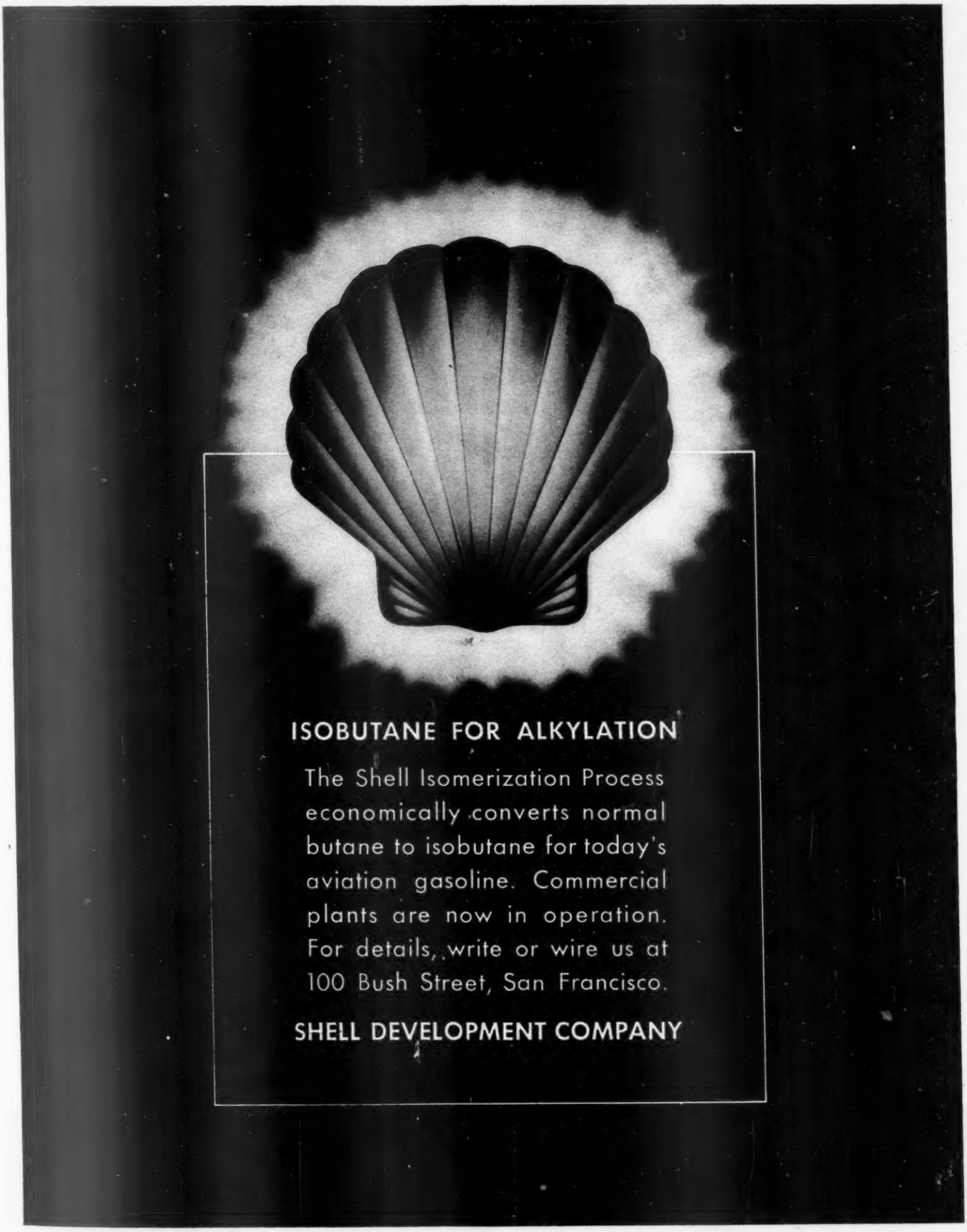
TABLE 2—CUTTING-FLUID RECOMMENDATIONS BASED ON MACHINABILITY RATINGS

Severity	Type of operation—	Machinability classification — Ferrous metals—irons, steels, etc. — 1: 70% or over	2: 50%-70%	3: 40%-50%	4: Below 40%	Nonferrous metals — 5: 100% or over	6: Below 100%
1.	Broaching—Internal	Em Sulf	Sulf* Em	Sulf* Em	Sulf* Em	MO Em	Sulf ML
2.	Broaching—Surface	Em Sulf	Em* Sulf	Sulf* Em	Sulf* Em	MO Em	Sulf ML
2.	Tapping—Plain	Sulf	Sulf	Sulf	Sulf	Em Dry	Sulf ML
2.	Threading—Pipe	Sulf	Sulf* ML	Sulf	Sulf		Sulf
3.	Threading—Plain	Sulf	Sulf	Sulf	Sulf	Em Sulf	Sulf
4.	Gear shaving	Sulf L	Sulf L	Sulf L	Sulf L		
4.	Reaming—Plain	ML Sulf	ML Sulf	ML Sulf	ML Sulf	ML MO Em	ML MO Sulf
4.	Gear cutting‡	Sulf ML Em	Sulf	Sulf	Sulf ML		Sulf ML
5.	Drilling—Deep	Em* ML	Sulf Em*	Sulf	Sulf	MO ML Em	Sulf ML
6.	Milling—Plain	Em* ML Sulf	Em	Em	Sulf	Em MO Dry	Sulf Em
6.	Milling—Multiple cutter	ML	Sulf	Sulf	Sulf* ML	Em MO Dry	Sulf* Em
7.	Boring—Multiple head	Sulf* Em	Sulf* Em	Sulf* Em	Sulf ML	K Em Dry	Sulf Em
7.	Automatic screw machine—Drilling, forming, tapping, turning, threading, reaming, box milling, cut off	Sulf ML Em	Sulf ML Em	Sulf ML Em	Sulf ML Em	Em ML† Dry	Sulf
8.	Turret lathe—Drilling, forming, tapping, turning, threading, reaming, box milling, cut off	Sulf ML Em	Sulf ML Em	Sulf ML Em	Sulf ML Em	Em ML† Dry	Sulf
9.	Drilling	Em	Em	Em	Em	Em Dry	Em
9.	Planing, shaping	Em* ML	Em* ML Sulf	Sulf Em*	Em* Sulf	Em	Em
9.	Turning—Single point tool form tools	Em ML Sulf	Em ML Sulf	Em ML Sulf	Em ML Sulf	Em ML Dry	Em Sulf
10.	Sawing—Circular, hack grinding	Sulf ML Em Em Sulf	Sulf ML Em Em Sulf	Sulf ML Em Em Sulf	Sulf ML Em Em Sulf	Dry Em MO Em MO	Sulf ML Em Em Sulf

*The recommendations are customary practice. Shop practice is divided on the other recommendations.

†Cases where some observers report the satisfactory use of emulsifiable paste-type compounds.

‡ (a) In threading copper, palm oil is frequently used. (b) It has been reported by several observers that emulsions are usually unsatisfactory on some precision machine tools such as Fellows and Gleason gear generators.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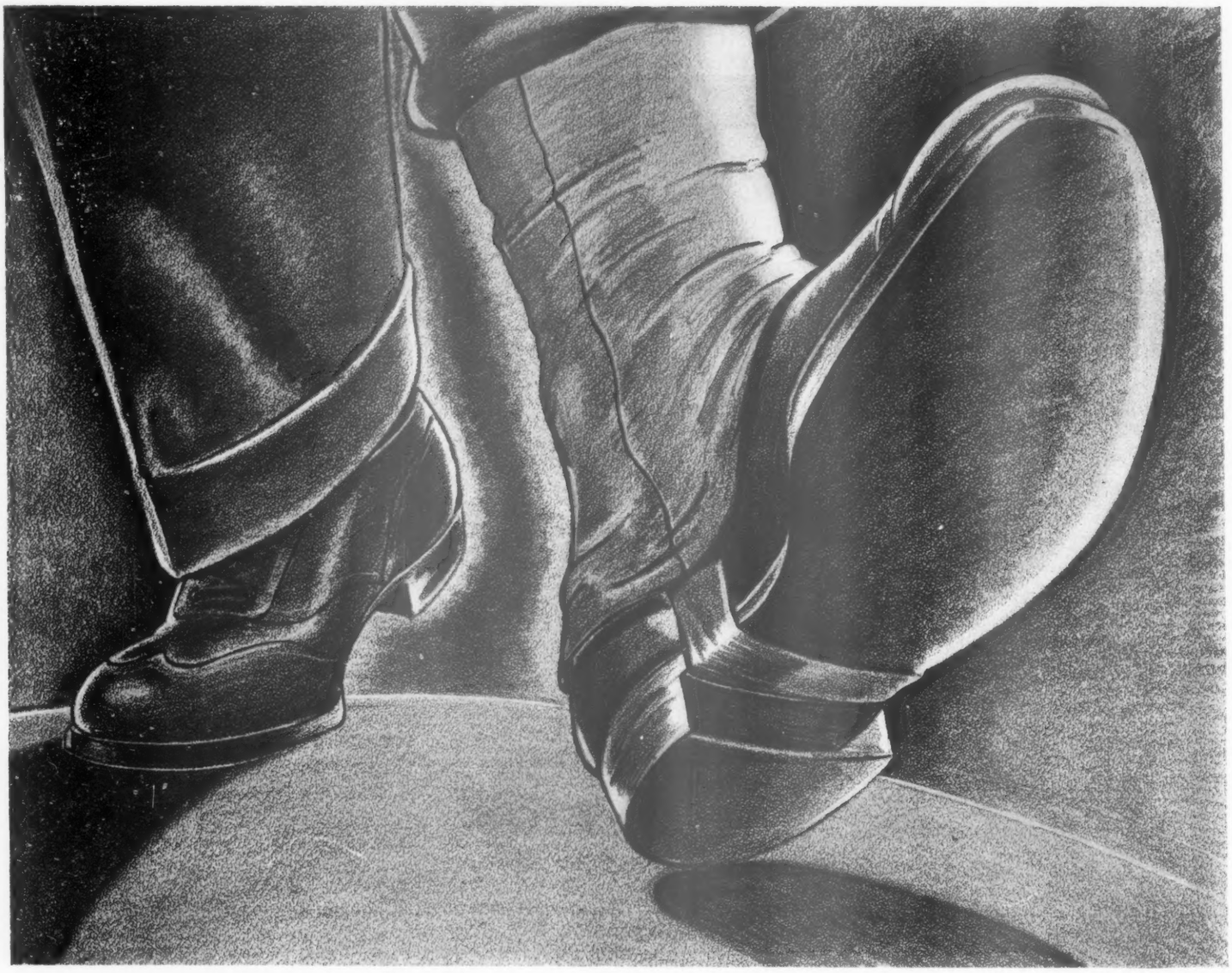

NOW THE SHOE IS ON THE OTHER FOOT

Ever since we can remember, our most important job has been selling you our equipment. Manufacturing the product, delivering it and following up with service were, of course, vital factors in the job; but they normally presented no problem. By comparison, they were routine.

All this time you, too, have had a job to do . . . probably a more important job than ours; for being responsible for the selection of the right product, be it ours or somebody else's brand, is truly no small responsibility.

Today, the picture is suddenly and drastically changed. Today, the shoe is on the other foot. Through no choice of our own, our No. 1 job is not to sell you something . . . and your No. 1 job is not **who** you're going to buy **what** from. We've both got another job to do, and we're proud of the fact that you're just as interested in getting it done as we are. We're glad we're both on the same side. We're proud to be in the same boat with you.

As long as the shoe stays on the other foot we're going to put all we have into this new job of ours. It may not interfere too much with our regular job of selling you our products, manufacturing, delivering and servicing them. We sincerely hope that it won't.

One thing is certain, however, we're going to get this new job of ours done . . . and properly done. And, when it's finished, any interruptions it may have caused will be wiped off the slate, and we'll be back on the old job full time . . . putting everything we have into it, as we have done for 45 years, to sell you . . . and serve you . . . and please you.

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CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

REPLACEMENT

MAY 7, 1942

CHART FOR DETERMINING TIME TO PAY OUT INVESTMENT

ENGINEERS and operators of all types of properties must always judge any addition to, or reconditioning of, existing facilities and the investments in new properties on the basis of the length of time required for the money to be returned, i.e., the pay out. When considered in this light, what sometimes appears at first blush to be a good investment is often determined to be a risky venture and one which may not repay the money expended.

For example take a small well of the stripper class making 2 bbl. per day which can be worked over and the production increased 100 per cent; the working over may require $2,000. The work results in an increase in the income of $2 per day after charges for lifting the oil have been deducted, at which rate it would require approximately 2.7 years to return the investment.

This is assuming that the increase in production will be maintained over that period, which is actually not the case as a natural decline will probably reduce the well's output, and about 6 years will be required to repay the money spent. In such a case the operator probably will never get his money back. A cheaper method of repair which does not result in such a large increase in production may be a much sounder investment.

The accompanying chart presents an easy method of determining the length of time required to pay out an investment when the increase in income can be determined or estimated. It does not take into consideration any charges for interest for the money invested and can be used mainly for estimation purposes. It is graduated in amounts of $10,000 with increases in daily income up to $100. By proper manipulation of the decimal point, it can be used for smaller invested amounts or for greater per day returns.

The value of a sum of money placed at interest for a number of years can be determined by the simple mathematical formula:

$$V = S(1 + nr)$$

Where:

V = amount of money.
S = sum of money.
n = number of years.
r = interest rate expressed as decimal.

The above formula is for simple interest and by substituting $2,000 for S, 3 for n, and 0.06 for r it is evident that a more accurate estimate of the pay out would be 3.07 years, if the increase in production were maintained.

At annual compound interest the above formula becomes:

$$V = S(1 + r)^n$$

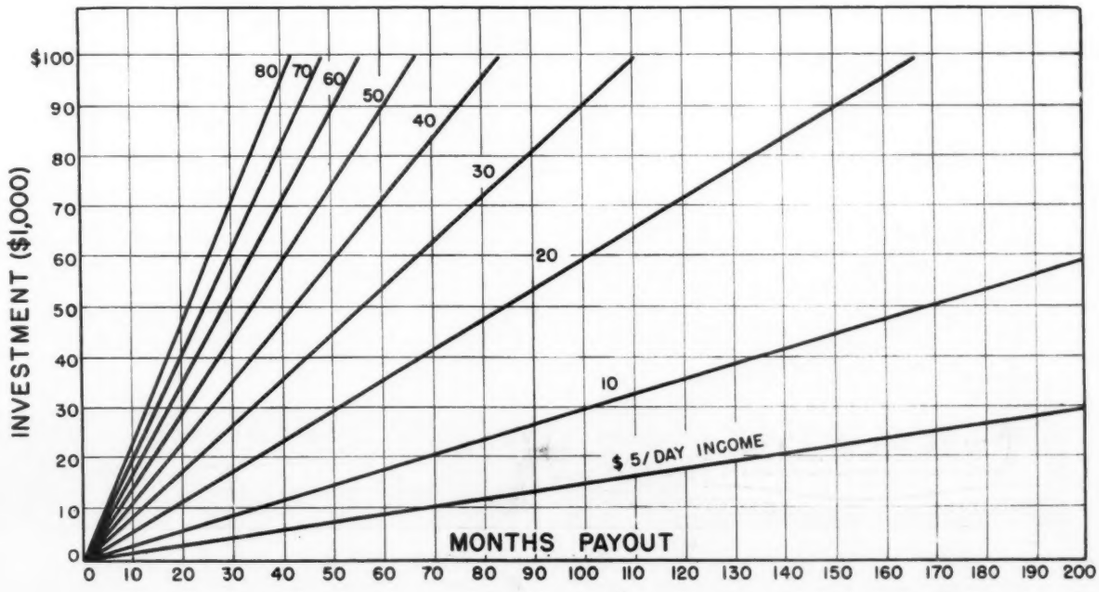
Again substituting the same values, a pay-out period of 3.26 years is obtained.

If the interest is compounded semi-annually the formula becomes:

$$V = S(1 + r/t)^{nt}$$

Where $t = 2$, the number of times the interest is compounded annually. Substituting the values given above, approximately the same value is obtained with annual compound interest.

When the decline in production of a well is considered, and an estimate of approximately 6 years is made for the pay out without considering the interest on the investment, it is seen that by the above formula for interest compounded annually the pay-out period becomes 8.04 years. The expenditure for repair is probably not justified and some cheaper method will have to be devised.



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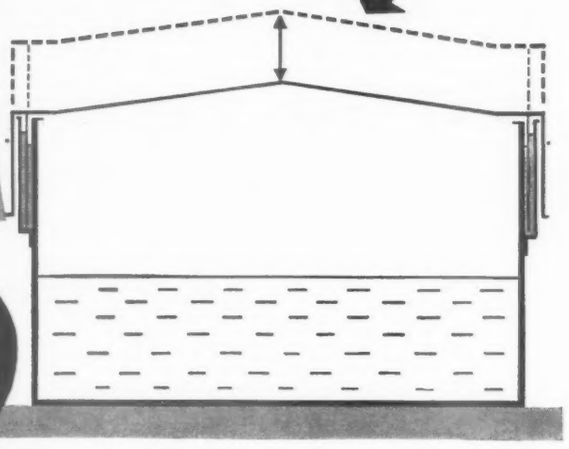
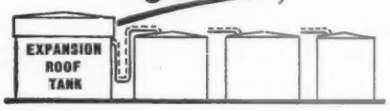
by providing ample space for expanding vapors--as needed



and



Where tanks are spaced reasonably close together, they can be manifolded to one tank of suitable capacity, equipped with a Graver Expansion Roof, which will handle the breathing of the entire battery. Here is complete protection at a minimum cost.

There isn't any loss from evaporation where a Graver Expansion Roof is used, for the vapors are not expelled. Oil-sealed all around, the Roof rises and falls as the vapors expand and contract, providing ample space to hold them at all times.

Thus, not only is there no loss of volume, but octane rating is also maintained, for the light ends, which would ordinarily be the first to go, are not lost.

In many instances, Graver Expansion Roofs can be installed on existing tanks, but where this is not feasible, Graver will design, fabricate and erect the equipment. In any case the savings will pay the entire cost in a surprisingly short time, and dividends will continue for years to come.

Right now, profits and dividends are of little importance as compared to the conservation of fuel so vital to Victory. Graver Expansion Roof will conserve both quantity and quality — will reduce fire hazard — and that's mighty important, too. Let us tell you about the benefits you can derive from the use of this modern conservation equipment.

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A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

MAY 7, 1942

CARE OF ROTARY-RIG CHAINS PAYS DIVIDENDS

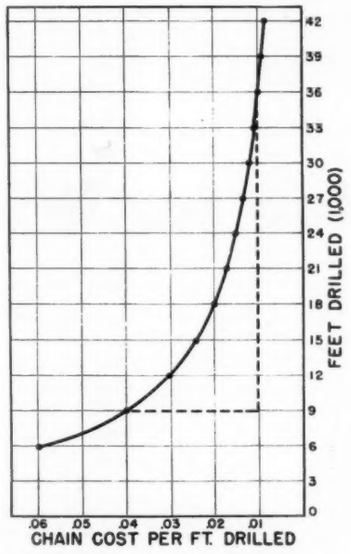
EXPENDITURE for chains on the rotary-drilling rig hoist and driving machinery generally is considered as one of the necessary evils. The chains are replaced whenever they begin to break frequently and the rig has to be shut down for repairs. Often the time consumed in repairing the chain is a minor expenditure in comparison to the hazard of getting the pipe stuck while the chain is being repaired. If the engine chain breaks while the pipe is some distance off bottom, or the blocks supporting the pipe are part way up the derrick, the danger of sticking the pipe is not so great. A break in the engine chain while on bottom can produce a nasty fishing job. If any other chain parts, the situation is not so bad as the pipe can be moved.

The fact that many chains begin developing breaks early in their lives is all too often accepted as a fault of the chain rather than the care given it. The operator may decide to change the style or the brand of chain used on the rig, with no improvement in performance.

Care of chains was discussed at considerable length in the April 30 issue of The Oil and Gas Journal (p. 167). All too often such discussions are considered as of academic interest only and everyone realizes that proper lubrication, shaft alignment and care of sprockets will result in a longer chain life. Unfortunately these factors are seldom translated into actual costs and charged directly against each foot of hole drilled.

Principal factor overlooked is the condition of the sprockets and the excessive costs caused by using one that is worn. This is generally due to the belief that the repair of the sprockets is not economical and that building up of the flanks and roots of the teeth should be postponed until they are really in a desperate state. When it is realized that through proper sprocket maintenance, the chain life can be increased over 300 per cent, it is evident considerable money can be spent profitably in this work.

The accompanying graph shows the cost per foot chargeable to chain wear for various lengths of chain life. The average life of the engine chain on a drilling rig is approximately 9,000 ft., at which point the cost per foot is approximately 4 cents. The chain life can be extended to 42,000 ft. by proper



care, at which point the chain cost per foot is approximately 0.0086 cent. This shows that an extraordinary cost of 3 cents per foot drilled for maintenance of chains through the repair of sprockets is justified.

From the chart it is also obvious that sprocket costs up to three times the cost of new chain will pay dividends. The repair of sprockets is not particularly costly as only very little metal is required to put them back in first-class condition. In general, and if at the present time ample steel were available, it would be cheaper to buy new sprockets than to use worn or poorly conditioned ones.

In an actual test, chain installed on new sprockets made 23,800 ft. of hole at which time the drive sprocket was replaced as the original one was becoming worn. The same chain then drilled 18,000 ft. more before being retired for a total of 41,800 ft. and an average cost per foot of 0.0079 cent. This includes cost of replacing the sprocket. Had the chain been treated in the usual manner, i.e., installed on a worn sprocket, the cost per foot of service for this chain would have been 2 cents.

Service obtained from chains can best be computed by the ton-mile formula similar to that discussed in the April 30, 1942, issue of The Oil and Gas Journal (p. 199). Actually, on rigs used in drilling shallow wells, chain life is greatly extended due to the operation on a greater margin of safety. Chains on such rigs are operating at a load only a fraction of their capacity and it would be unfair to compare the number of feet drilled to the service obtained from chains used on rigs drilling in a much deeper area. The ton-mile method allows a comparison of chain service regardless of the depth of the wells. About 20,000 ton-miles is the average service, 50,000 ton-miles is considered good service and 100,000 ton-miles is considered exceptional service.

Because wear of the sprockets cannot be ascertained by visual inspection, one operator has designed a template of thin steel which can be fitted onto the sprocket to determine the amount of wear on the flanks and roots of the teeth. It has been found that only a slight amount of wear is necessary before the chain life is affected appreciably.

It should also be apparent that running a worn-out chain on a sprocket will damage it materially so that it in turn will cause undue wear when a new chain is installed. Retiring the chains at the proper time will also prove to be sound economy.

HAULING JEEPS ACROSS RAVINES

Another Job for Wickwire Rope

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• • •

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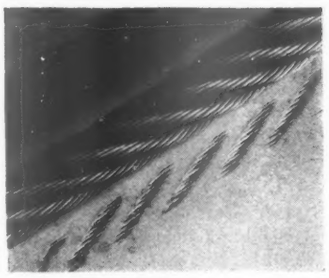

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WISSCO PRODUCTS

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 13

MAY 7, 1942

CALCULATING GAS DEVIATION BY PSEUDOCRITICAL METHOD

IN Table 2 of Installment 11, deviation data were given in terms of specific gravity. These data do not extend beyond a pressure of 800 lb. per sq. in. At higher pressures, deviation data based on specific gravity cannot be satisfactorily given. At these higher pressures, the pseudocritical method, devised by Kay,* can be used.

It is rather confusing that various authorities use different means of expressing deviation. In connection with previous discussion the deviation factor d has been used and is defined in Installment 11. In the present discussion a deviation factor δ will be used. The value of δ corresponds to the reciprocal of d, or $\delta = 1/d$. Values of d were given in Table 2, Installment 11.

Before presenting the pseudocritical method it will be necessary to define some fundamental terms, which are: critical temperature, critical pressure, reduced temperature, reduced pressure, mol, mol fraction, mol analysis.

Critical temperature may be defined as the temperature above which a gas cannot be liquefied by application of pressure. *Critical pressure* is the absolute pressure required to liquefy a gas at its critical temperature.

Reduced temperature, in this discussion, is the ratio of actual absolute temperature to absolute critical temperature. *Reduced pressure* is the ratio of actual pressure to absolute critical pressure.

A *mol* of any gas may be defined as a weight of that gas equivalent to its molecular weight. The molecular weight is determined by the atomic weight of each chemical element of which the gas is composed and the number of atoms of the various elements constituting one molecule of the gas. For example, the atomic weight of carbon is 12 and the atomic weight of hydrogen is 1. Then the molecular weight of ethane, since each molecule is composed of two carbon atoms and six hydrogen atoms, is $2 \times 12 + 6 \times 1$, or 30. Molecular weights of other common components of natural gas are given in Table 1.

*W. B. Kay, Ind. Eng. Chem., Vol. 28, p. 1014, 1936.

As commonly used by the engineer of this country, the word "mol" usually signifies "pound-mol." "Gram-mol" is more common in considerations involving metric units. As an example, a pound-mol of ethane means 30 lb. of ethane; while a gram-mol of ethane means 30 g. of ethane.

Mol fraction is the fractional part that the number of mols of any component gas in a mixture of gases represents of the total number of mols of all gases in the mixture. A *mol analysis* is merely a tabulation of the mol fractions of various component gases in the natural gas. The mol analysis is numerically the same as the volume analysis for a mixture of gases.

Component—	A Mol fraction	B Critical temperature °F., abs.	C Critical pres., lb. per sq. in., abs.	D A × B	E A × C
Methane	0.756	344	673	260.06	508.79
Ethane	0.152	550	717	83.60	108.98
Propane	0.054	664	632	35.86	34.13
n-Butane	0.025	764	529	19.10	13.23
Carbon dioxide	0.013	548	1,072	7.12	13.94
	1.000			405.74	679.07

The pseudocritical method may be outlined as follows:

1. The mol fraction of each component is multiplied times the absolute critical temperature of that pure component.

2. The products obtained in the multiplications of step 1 are added together to obtain what is termed the pseudocritical temperature for the mixture.

3. The mol fraction of each component is multiplied times the absolute critical temperature of that pure component.

4. The sum of the products obtained in step 3 represents the pseudocritical pressure for the mixture.

5. The reduced temperature is obtained by dividing the actual absolute temperature at which deviation is desired by the pseudocritical temperature obtained in step 2.

6. The reduced pressure is obtained by dividing actual absolute pressure at which deviation is desired by the pseudocritical pressure obtained in step 4.

7. The deviation factor δ is obtained from the chart, Fig. 1 (p. 74).

Example 1.

Problem.—Calculate the volume at standard conditions (14.7 lb. per sq. in., abs., and 60° F.) that would be occupied by the gas contained in 1 cu. ft. of space at a pressure of 1,850 lb. per sq. in., abs., and 100° F. (analysis of the gas is given in the following tabulation):

Solution.

Pseudocritical temperature = 405.74.

Pseudocritical pressure = 679.07.

Reduced temperature = $(460 + 100)/405.74 = 1.380$.

Reduced pressure = $1{,}850/679.07 = 2.724$.

From Fig. 1, δ is found to be 0.73; (note dotted lines).

Then, $d = 1/0.73 = 1.370$.

So the given gas at standard conditions would occupy a volume of

$$V = \frac{1{,}850 \times 1 \times (460 + 60)}{(460 + 100) \times 14.7} \times 1.37 = 160 \text{ cu. ft.}$$

Not considering deviation the result would have been 117 cu. ft.

TABLE 1—PROPERTIES OF NATURAL-GAS CONSTITUENTS

Gas—	Molecular weight	Critical temperature, °F. abs.	Critical pressure lb. per sq. in., abs.
Methane, CH_4	16	344	673
Ethane, C_2H_6	30	550	717
Propane, C_3H_8	44	664	632
Normal butane, C_4H_{10}	58	764	529
Isobutane, C_4H_{10}	58	733	544
Normal pentane, C_5H_{12}	72	847	485
Isopentane, C_5H_{12}	72	830	484
Normal hexane, C_6H_{14}	86	915	433
Normal heptane, C_7H_{16}	100	976	405
Carbon dioxide, CO_2	44	548	1,072
Nitrogen, N_2	28	227	492
Oxygen, O_2	32	278	730

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 13

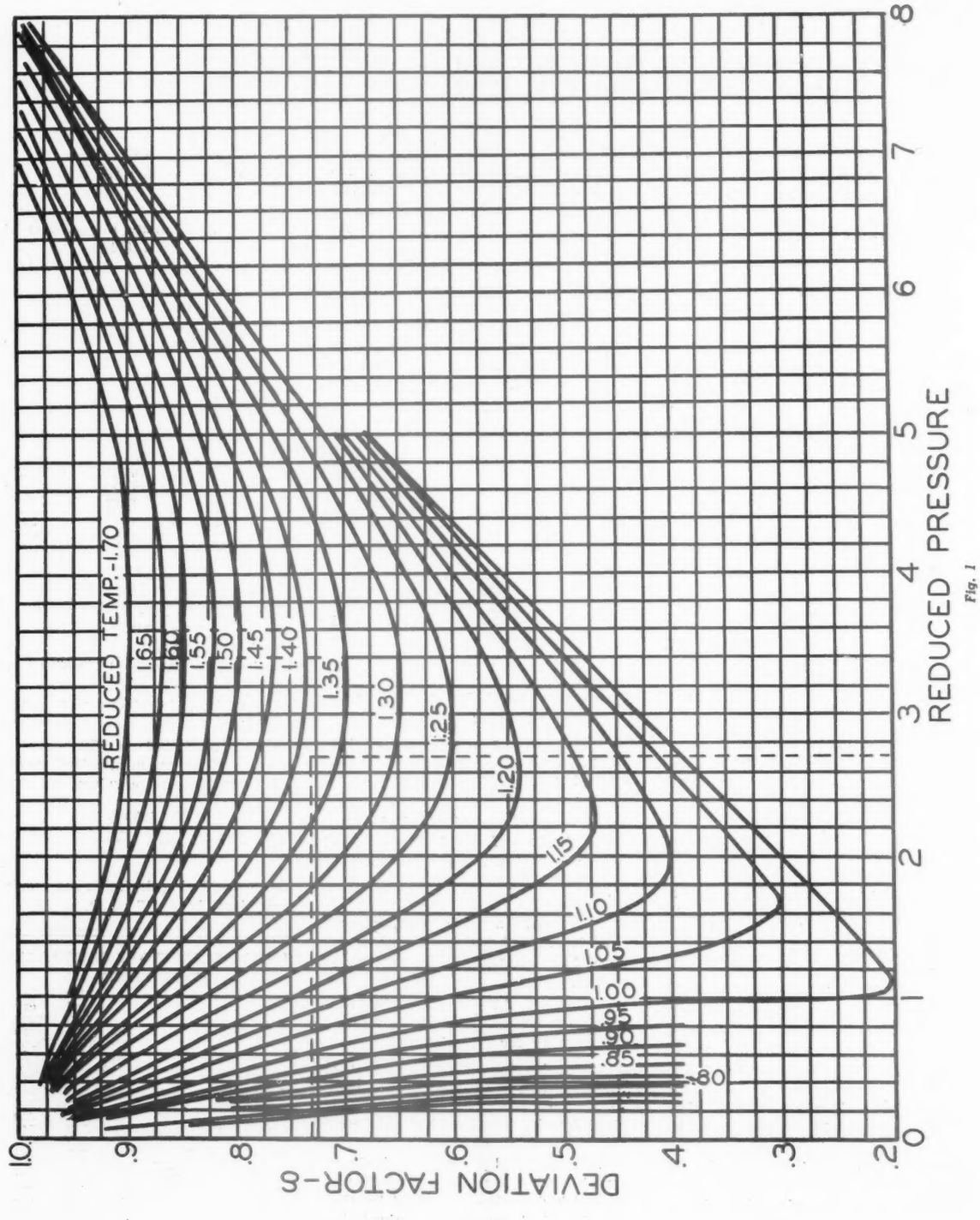

Fig. 1

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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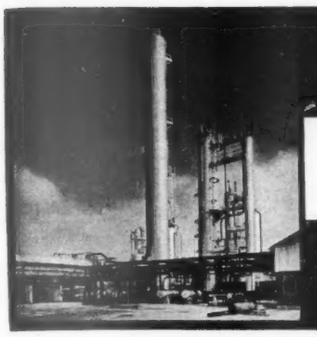

REFINERY ACTIVITY AND EXPANSION

American Companies Instructed to Make Catalytic Processes Available to U.S.S.R.

WASHINGTON, D. C.—Eight American development and refining companies have been instructed by the Office of Petroleum Coordinator to arrange transmittal of process patents and "know how" to Machinoimport, a department of the U.S.S.R., for application of thermal cracking and reforming, sulfuric acid alkylation, polymerization, catalytic cracking, hydroforming and dehydrocyclization.

International Catalytic Oil Processes Corp., Standard Oil Development Co., Standard Catalytic Co., Shell Development Co., Texaco Development Co., Standard Oil Co. (Indiana), Universal Oil Products Co., and M. W. Kellogg Co., are the concerns to which OPC instructions specifically apply.

These companies, according to instructions in OPC Recommendation 42, "shall negotiate for the sale to Machinoimport of the rights in certain oil-refining processes . . . and for the furnishing to Machinoimport of the designs, specifications and other data necessary for the construction and operation of plants for the practice of such processes."

"The several companies," reads the directive, ". . . shall proceed with all steps and action necessary or appropriate in order to carry on said negotiations and fully to carry out any such contract so entered into, including, but without limitation, arrangements for preparation of designs and specifications and for doing other engineering work involved so that contractors or others selected by Machinoimport may construct such plants. . . . International Catalytic will acquire from the respective owners their rights and technical data necessary for the construction and operation of said plants and arrangements pursuant to which cooperative development of said processes may be continued by the respective companies concerned so that the development and improvements thereby perfected may be made available to Machinoimport."

In the negotiations culminating in issuance of the directive order, International Catalytic advised the OPC tthat it would be necessary to place at the disposal of Soviet engineers the results of the research and development work of several companies.

International Catalytic proposed to acquire from the respective owners their rights and technical data necessary for the construction and operation of the plants contemplated by Machinoimport, for a consideration to be agreed upon, the rights of other companies in the processes requested by the Soviet agency.

For the purpose of preparing designs, specifications and other data, the facilities of the various companies will be made available to International Catalytic.

Machinoimport and its contractors will be required to keep confidential and use only for the purpose of the proposed plants the data furnished under the arrangements worked out between International Catalytic and the OPC.

●

California Refiners Adopt Aviation-Fuel Processes

LOS ANGELES, Calif.—Wilshire Oil Co., large independent refiner, is converting a part of its Norwalk, Calif., plant to the production of aviation gasoline and initial equipment is being delivered.

Eagle Oil & Refining Co., another California company, has made a deal with Douglas Oil & Refining Co. whereby the latter will make motor fuel for and according to specifications of the former. This will permit Eagle to adopt part of its Santa Fe Springs refinery to the production of aviation gasoline. In addition to Eagle, Douglas Oil & Refining Co. is taking crude from and processing for Sunset Oil Co., Krieger Oil Co., and Exeter Oil Co. on a throughput basis.

Standard of New Jersey Awards Baltimore Contract

BALTIMORE, Md.—Standard Oil Co. of New Jersey has awarded a contract to the M. W. Kellogg Co. for the construction of new facilities for the "processing of gasoline" at its Baltimore, Md., refinery. The refinery has a capacity of 37,000 bbl. per day. The new facilities to be installed will cost several million dollars.

Blending Agents in Aviation Gasoline Are Restricted

WASHINGTON, D. C.—Two sections of the Office of Petroleum Coordinator Recommendation 8, covering use of blending agents in motor fuel, have been amended. The first amended section, 1504.2, restricts the use of certain blending agents to production of 100-octane gasoline.

The other amended section specifies that 85-octane gasoline is to be produced from a base stock of not greater than 67 octane by adding tetraethyl lead.

The two amended sections read:

1504.2. *Use of blending agents.*—All persons, natural or artificial, engaged directly or indirectly in the production or manufacture of aviation gasoline or in the production or manufacture of gasolines containing blending agents of a petroleum origin, such as but not limited to, isooctanes, including alkylates, hot acid octanes, and hydrocodimers, isopentanes, and neohexanes, cease to use such blending agents except for the production and manufacture of 100-octane aviation gasoline or such other aviation gasolines as may hereafter be designated by the Office of the Petroleum Coordinator generally or in specific instances which, in the opinion of said office, do not adversely affect or conflict with the war effort.

1504.4. *Base stock of aviation gasoline of 85-octane number or less.*—All grades of gasoline used for aviation purposes having an octane number of 85 or less, as determined by the 1-C aviation method, shall be produced by the addition of tetraethyl lead to a clear gasoline having an octane number not greater than 67 as determined by the 1-C aviation method, except as may otherwise be designated by the Office of Petroleum Coordinator for War in special cases which, in the opinion of said office, do not adversely affect or conflict with the war effort.

Refiners May Continue Use Of Cans for Motor Oil

WASHINGTON, D. C.—Cans containing motor oil and certain other products will be available to the consumer for a while longer because of an amendment to Conservation Order M-81, issued April 30 by the War Production Board.

In addition, the amendment permits the utilization of tinplate sheets which are usable only for food cans of sizes restricted by the original regulations, if the sheets were on hand February 11.

This latter exception, which extends also to can parts which were lithographed, cut, or otherwise prepared for assembly on or before February 11, is effective until further order by the director of industry operations.

Sketches of Plant Operators . . .

D. R. JOHNSON, who has been associated with Continental Oil Co. for 18 years, has recently been appointed superintendent of Continental's Ponca City, Okla., refinery, suceeding Fred G. Fellows, resigned.

Mr. Johnson joined Continental at Glenrock, Wyo., as an electrician in 1924, following 2 years' experience with Westinghouse as an apprentice. Later promotions at Glenrock included appointments as shift foreman and, in 1928, assistant superintendent. He was transferred to Ponca City in 1929 as inspection supervisor and was later made chief inspector.

In 1935 he was made assistant to the manager of the manufacturing department, and in October of last year was made assistant superintendent.

Because of the increased volume of work brought about by changes in processing to manufacture special products for war use in the Ponca City refinery, an additional position of assistant superintendent has been established. H. A. Mertz, who has been superintendent of construction in the engineering department, and L. L. Smith, formerly superintendent of the Denver, Colo., refinery, are the new assistant superintendents. Mr. Mertz has been with Continental since 1917, and Mr. Smith joined the company in 1924. Prior to his appointment as superintendent of the Denver refinery, he held the same position at the Lewistown plant.

WHO'S WHO IN REFINING

Standard Oil of California

THREE refineries with combined capacity of 225,000 bbl. daily are operated directly by Standard Oil Co. of California, the largest potential throughput of any Pacific Coast operator. Each of two Standard of California refineries have capacity of 100,000 bbl. daily.

"Production for Emergency" was the keynote of refinery activity during the past year, according to the company's annual statement distributed last week. Demands of the armed forces and the Pacific Coast in general resulted in operation of previously unused capacity.

The company will add materially to its present output with the completion of plants this year, including the new Houdry catalytic cracking unit which was started in 1941.

Research and development activities, long a major pursuit of the company's manufacturing department, are now aimed at the production of superior fuels, lubricants and chemicals invaluable in wartime. Special consideration is being directed to processes for increasing aviation-fuel production and, last year, important contributions were made to instrumentation required in studying the performance of aircraft and automotive engines. Synthetic production of toluene is another major project in the research and development division.

Capacities and locations of the company's three refineries are given in the following:

Location—	Capacity (bbl. daily) Crude oil	Cracked gaso.
Richmond, Calif.	100,000	14,000
El Segundo, Calif.	100,000	21,000
Seguro, Calif.	25,000	.....
Total	225,000	35,000

The company is fully integrated, operating producing properties in most of California's larger fields and, in addition, has refineries and producing facilities operated through subsidiaries in several southwestern states and in foreign countries. Bahrein Petroleum Co., Ltd., is owned jointly with the Texas Co. and this affiliate operates a refinery of 25,000-bbl. capacity on Bahrein Island, Persian Gulf.

A foreign refinery is operated on the Arabian mainland by California Arabian Standard Oil Co., a company owned jointly by Standard of California and the Texas Co. The affiliate holds exploration concession on nearly 160,000,000 acres in Saudi Arabia and has developed substantial production and reserves of crude.

Another subsidiary, Standard Oil Co. of Texas, operates a 14,000-bbl. plant at El Paso, Tex., and the company owns an interest in Col-Tex Refining Co., which has a 12,500-bbl. refinery at Colorado City, Tex.

The company's Pacific Coast refinery products are distributed through a network of retail outlets and large volumes are normally exported in company-owned and chartered tankers. Refineries draw their crude supplies through pipe lines, marine and overland transportation facilities. Recently, the company launched a project to convert a 24 and 26-in. gas line from the Kettleman Hills district to San Francisco to crude-oil service. The line was jointly owned with Pacific Gas & Electric Co. and commonly known as the Stanpac system.

Manufacturing operations of Standard of California are under direction of R. G. Follis, general manager, who is now serving his first year as a member of the board.

H. D. Collier is president. Vice presidents are J. H. Tuttle, who is also treasurer; R. K. Davies, now on leave of absence serving as deputy petroleum coordinator; R. C. Stoner, J. L. Hanna, J. H. MacGaregill and P. H. Patchin.

Production of refinery gasoline is supported by output of 18 natural-gasoline plants operated in California and one in Texas.

Crude runs during 1941 by California refineries under direct management of the Standard of California averaged 156,519 bbl. daily, an increase of 10.8 per cent over the 141,299 bbl. daily in 1940.

●

Reduction of Asphalt Use in Eastern States Requested

WASHINGTON, D. C.—A reduction of 3,500,000 bbl. in the annual consumption of asphalt, tar and related products in the East Coast curtailment area was urged last week by the Office of Petroleum Coordinator. Voluntary deferment, for the duration of the war, of all nonessential uses of the products for highway, street, road and other paving purposes in the 17 East Coast states and the District of Columbia was requested in Recommendation 47.

Explaining the reason for the recommendation, Ralph K. Davies, deputy coordinator for OPC, said it was prompted by the necessity of diverting railroad tank cars normally used to haul asphalt and tar to the Atlantic states to the more important work of bringing crude and residual fuels into the area for war purposes.

Restricted products may be used until May 9 but only where equipment and materials have been placed upon the location on or before April 24.

MORE AND MORE GAS PLANTS Are Using *Florite* for dehydration

Because of its LONGER LIFE and HIGH DRYING EFFICIENCY

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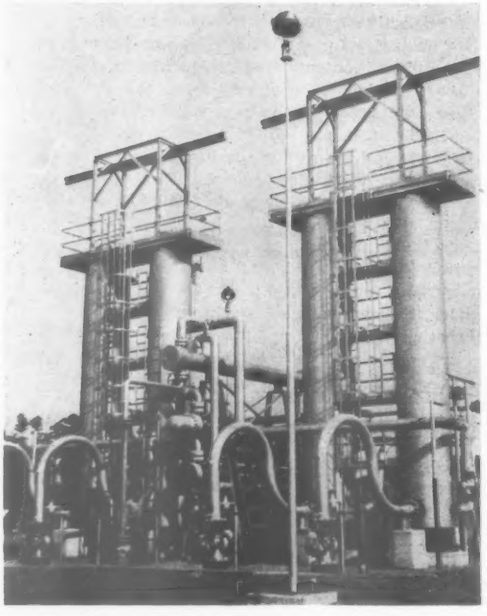
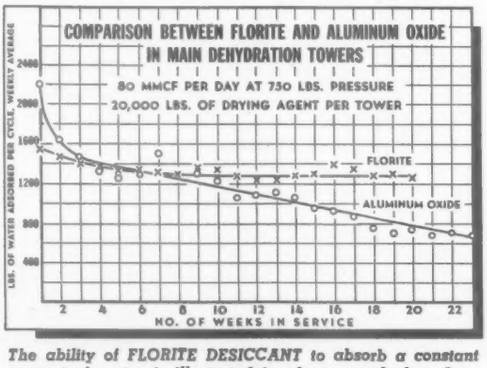
FLORITE has two advantages over competitive drying agents. First—its ability to selectively adsorb a relatively constant weight of water, day after day and week after week as indicated in the accompanying chart. Second—its very high drying efficiency where bone dry gases and liquids are required, such as the dehydrating of natural gas, propane, gasoline, air, nitrogen, carbon dioxide, refrigerants, etc.

FLORITE selectively adsorbs 4 to 20% of its weight in water, depending upon the particular application, and is regenerated by heating to 300-350°F. We invite correspondence on your particular drying problems. WRITE FOR DESCRIPTIVE LITERATURE.



Recent Installation Using FLORITE (name on request).


COMPARISON BETWEEN FLORITE AND ALUMINUM OXIDE
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20,000 LBS. OF DRYING AGENT PER TOWER
FLORITE
ALUMINUM OXIDE
LBS. OF WATER ADSORBED PER CYCLE, WEEKLY AVERAGE
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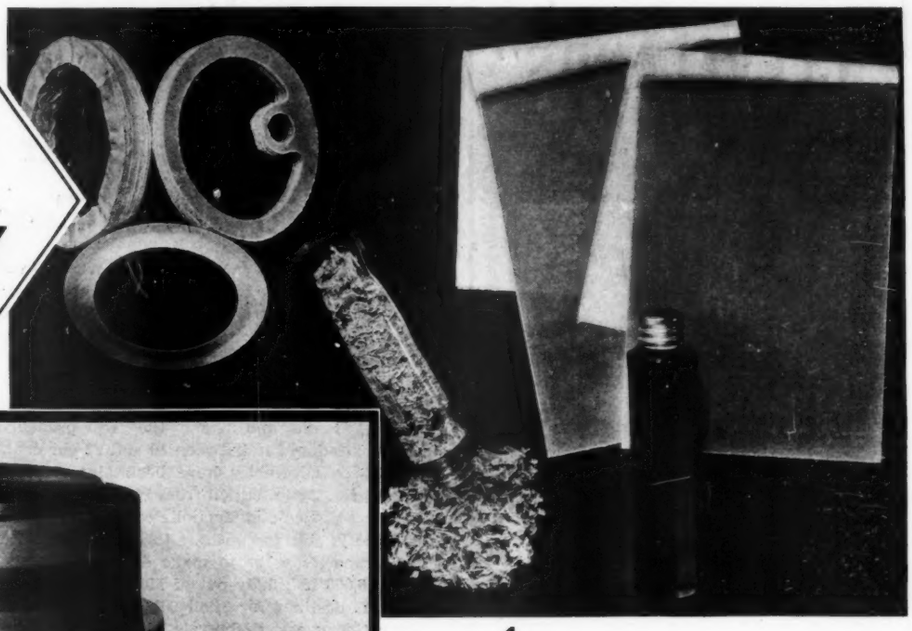

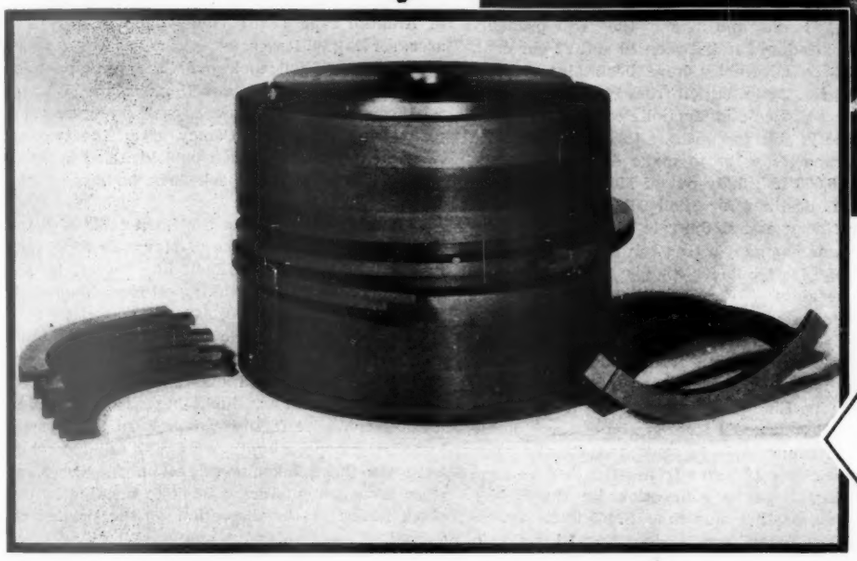

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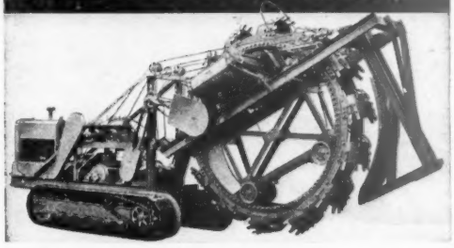

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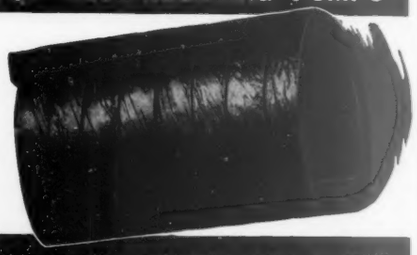

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Pipe-Line Activity

Shell Takes Over Major Company Runs in West Texas-New Mexico

TO meet emergency conditions in West Texas and New Mexico, for the mutual benefit of itself and other carriers, Shell Pipe Line Corp. has leased pipe-line connections of several major carriers on a large scale.

Allowables of larger prorated Texas fields in March were 58 per cent of operating time; in April 40 per cent, and in May they will probably be further reduced to between 19 and 22 per cent. New Mexico allowables have been also reduced substantially. By taking oil from Humble, Atlantic, Texas-New Mexico and Magnolia connections, Shell Pipe Line is able to continue to operate its lines at full capacity so as to make deliveries at the rate of 48,000 bbl. daily out of McCamey to Cushing, Okla., destined for Shell Oil Co., Inc.'s Wood River refinery, and at the rate of 36,000 bbl. daily to the same company's Houston refinery, making a total of 84,000 bbl. for Shell's West Texas-New Mexico receipts.

As allowables have been reduced, Shell has progressively increased the number of connections temporarily leased from other carriers. On April 1 the company took over connections from Humble Pipe Line to 58 leases in the Wasson pool which represent about five-eighths of the Humble Pipe Line connections in that area. On the same date it took over 18 leases from Atlantic Pipe Line comprising all of its connections in the Hobbs, N. M., area. At the same time, Shell took over 59 leases from Texas-New Mexico Pipe Line Co. in the Eunice and Monument, N. M., areas. Texas-New Mexico Pipe Line normally collects for Texas Co., Cities Service, Sinclair and Tide Water Associated.

On April 26 Shell took over connections to an additional 43 leases from the same carrier in the same area. On the same day Shell took over all of Atlantic Pipe Line's connections in the same area, serving 38 leases.

On May 1 Shell took over the remainder of Humble Pipe Line's connections in the Wasson pool, comprising 48 leases, as well as connections to 82 leases in the McCamey area. The two arrangements in the Wasson pool included approximately 200,000 bbl. of back-stock tenders on the 86 leases in the area.

Furthermore, on March 20, Shell took over the runs but not the facilities of Magnolia Pipe Line in the Wink, Tex., area, including 150,000 bbl. of storage oil. Shell is still taking oil from Magnolia's connections at Wink.

In arrangements made with Atlantic, Humble and Texas-New Mexico pipe lines, gathering systems have been leased extending from the producers' lease tanks, including field pumping units, etc. Where facilities have been temporarily leased, field operating crews of the other carriers have also been taken over. All of the described lease arrangements are subject to termination on short notice at the discretion of the parties involved.

Texas-Empire's Humboldt Station Nears Completion

Work of installing electric centrifugal station equipment for Texas-Empire Pipe Line Co. at Humboldt, Kans., is nearing completion. This station, together with the other two stations planned by the company for locations near Eureka and Hiattville, Kans., is part of a program for increasing capacity of the system serving Kansas fields from 23,000 bbl. to 43,000-44,000 bbl. daily. By utilizing facilities of the pump station of Sinclair Refining Co. at Humboldt, Kans., 34,000 bbl. of Kansas oil is now being moved through this system of Texas Empire. This pumping arrangement is made possible by using two 1.1-mile 10-in. lines laid several years ago to connect the Texas Empire line with Sinclair's Humboldt trunk-line station.

Plans for Big Line From East Texas Are Made

Specifications have been prepared for a project to carry oil from the East Texas fields into the Illinois basin and Ohio River shipping points according to reports.

Plans call for utilization of second-hand pipe and rebuilt pumping equipment and it is said that no approval from the priorities administration of WPB-OPC is necessary to build the line. Earlier this year, priorities officials refused the request of Coordinator Harold Ickes for diversion of new steel for such a project.

Industry surveys, however, disclosed approximately 1,400 miles of old 10 and 12-in. pipe that can be dug up or salvaged for the new line.

El Dorado-Helena Line Is Under Consideration

Plans are being seriously considered for a system for moving refined products from Gulf Coast points to Helena, Ark., by Gulf and Texas Co. interests. This system would use lines now being operated for crude and refined products service and would require the construction of 150 to 160 miles of 10-in. between El Dorado and Helena, Ark. This project is not one of those included in the 10 projects which were originally studied when a report was prepared by subcommittees for OPC.

Shipments by Texas Co. would go to Shreveport, La., by reversing flow through the 8-in. line leased several years ago from Arkansas Fuel Oil Co. From Shreveport, La., to El Dorado, Ark., products will go through lines which have been in crude-oil service. Movement of products for Gulf from Port Arthur, Tex., to El Dorado, Ark., will be through pipe lines which have been in crude-oil service.

It is reported that Magnolia interests are also considering making use of the Gulf Coast-to-Helena system which is being studied.

Pipe Lines Oppose New Tax Proposal

Henry Morgenthau, Jr., secretary of the treasury, has suggested that a 10 per cent tax be imposed on the transportation of petroleum and all liquid products thereof by pipe line.

The present tax rate is 4½ per cent, and the proposed tax would be paid by the pipe line performing the service, as is the case in the

Pipe-Line Personalities . . . . . L. H. Favrot

LAWRENCE H. FAVROT, president, Latex Construction Co., Houston, Tex., was born in Leesville, La. He grew up in Baton Rouge and graduated from high school in 1917. After taking courses in arts and sciences for a year at Louisiana State University he discontinued his studies for a period of 1½ years to go to the tropics, where he was employed by Honduras Sugar & Stilling Co.

After returning to the United States, he resumed his college education at University of Michigan, where he was graduated with an A.B. degree in business administration in 1924. Following his graduation he became associated with Ford, Bacon & Davis, Inc., and worked out of the New York office for a year.

In 1925 he joined the Williams Brothers organization in Oklahoma as timekeeper; the next year he was promoted to superintendent and held that position until 1931, when he was sent to Houston, Tex., as president of Apex Construction Co., Inc., which had been formed by Williams Brothers to operate in the Gulf Coast area. Mr. Favrot returned to the Tulsa office in 1936 when he became vice president of Williams Brothers Corp.

At the end of that year he resigned to organize Latex Construction Co., in the direction of which he is associated with George A. Peterkin. Since a large part of the company's work is in the Gulf Coast region, special attention has been given by the company to methods for increasing the efficiency of construction operations in swamps and marshes. Among the 1941 projects on which Latex conducted construction work are Plantation Pipe Line Co.'s Baton Rouge-Greensboro line and United Gas Pipe Line Co.'s Lirette-Mobile line.

Reading and travel are important in Mr. Favrot's recreation. He is married and has three children, two girls and a boy.

present instance. Experts of the Treasury Department say the increase would produce $18,700,000 in additional revenue.

Already the Treasury officials are seeking to strike entirely, or to reduce the depletion and allowance rule, and the matter is being argued before the ways and means committee of the House and likely to be debated on the floor of the House or Senate.

H. C. Price Plans to Undertake General Pipe-Line Contracting

Preparations are being made for expanding the organization of H. C. Price Co., which has been engaged exclusively in the electric welding of pipe lines and oil-field casing. The expansion program is being carried on for the purpose of undertaking general contracting of pipe-line construction throughout the United States. In making this departure from the previous policy of specializing on welding, the company plans to handle the laying of all types of pipe lines.

In the period during which the organization has been operating since the pioneer days of pipe-line welding, it is stated that it has welded more than 12,000 miles of oil and gas lines in North and South America.

Exponents of thorough and extensive training in electric welding, the H. C. Price organization has been able to furnish supervisors and welders to America's shipyards as an aid to the war effort.

Aero Exploration Co. Announces Changes

Russell F. Hunt is taking a leave of absence from Aero Exploration Co. of which he has been president until May 1, in order to accept a commission as first lieutenant in the U. S. Army Air Corp. Early this week he reported for duty with the Air Technical Training Command at Scott Field, Belleville, Ill.

T. N. Law, formerly vice president, became president on May 1, and is taking active charge of the affairs of the company. Mr. Law is president of Falcon-Seaboard Drilling Co., and director of Mid-Continent Airlines, Inc.

Fred Q. Casler, who preceded Mr. Hunt as president, was commissioned in the 125th Observation Squadron several months ago. In the meantime he has been transferred to duty with armed forces in Australia.

Tapco Asks Consideration Of Revised Proposal

Reconsideration of the Tapco pipe-line project, as amended to include a 300-mile extension to the Permian basin in West Texas, was asked of Defense Transportation Director Joseph B. Eastman by officials of the Trans-American Pipe Line Corp.

The new proposal contemplates an 8-in. line from the Permian basin, with seven pumping stations, to Wichita County, and a 12-in. line from Wichita County to Savannah, Ga.

Montana-Dakota Will Lay Natural-Gas Line

The Montana-Dakota Utilities Co. is ready to begin construction of a 26-mile 6-in. welded high-pressure gas line from the Texas Co. gas wells in North Cut Bank, Montana, to a connection with its line from northern Montana to Great Falls, Mont. Construction has been authorized by the War Production Board, the pipe is on hand and right-of-way has been acquired. Priorities were granted on the showing that additional gas was needed for the Anaconda Copper Mining Co. smelter at Great Falls, and for domestic consumption.

Purpose of Phillips Line Is Explained to Commission

Some uncertainties regarding the Phillips Petroleum pipe line from West Texas to Borger, Tex., were cleared somewhat when E. F. Foster, Phillips attorney, told the Texas Railroad Commission:

(*a*) It will be a refined products line, (*b*) will not handle crude, (*c*) will collect products from Phillips plants at Hobbs and in Texas areas, (*d*) will deliver products to a new butadiene plant at Borger, and (*e*) the right-of-way has been purchased.

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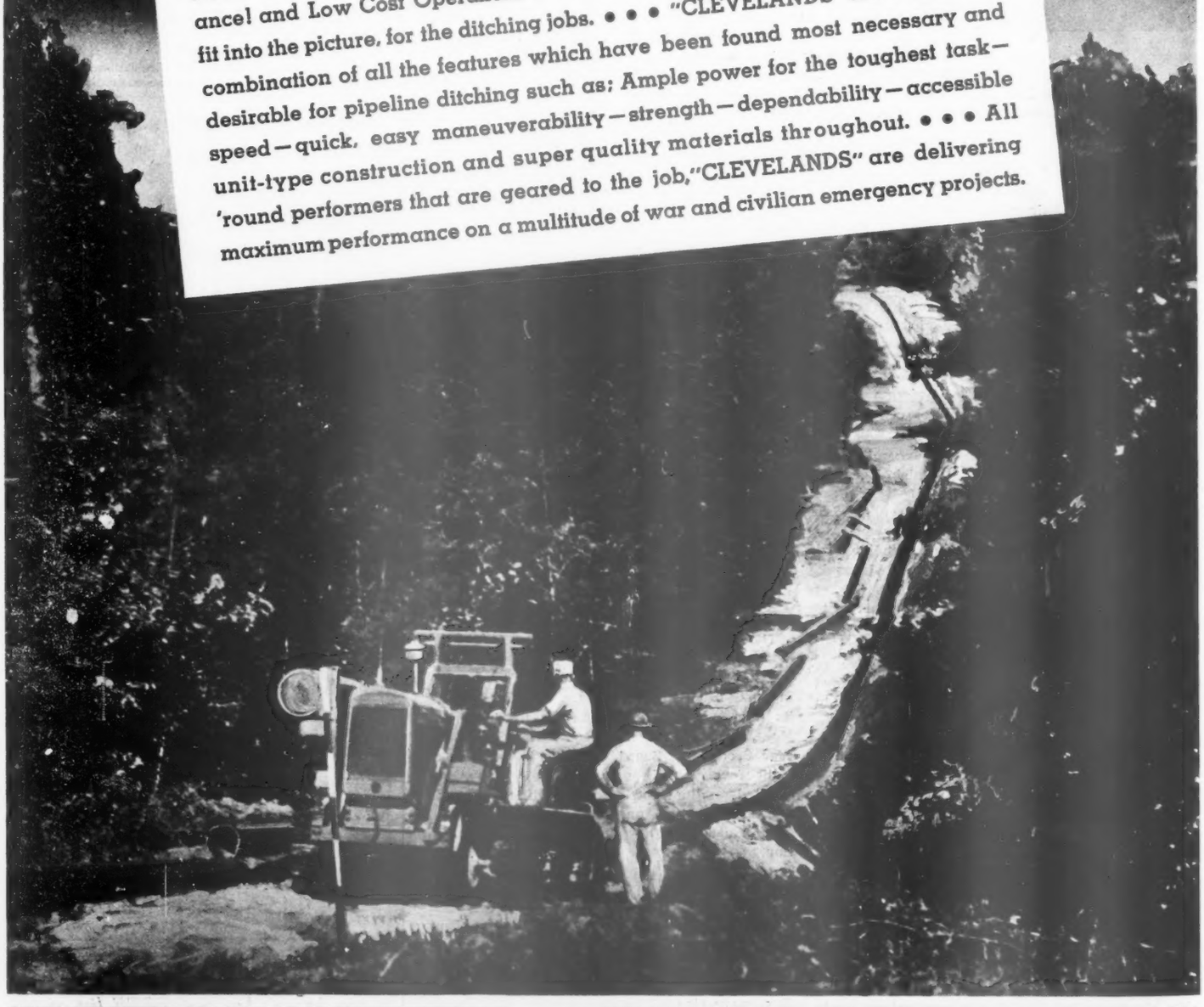

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

For the first time since March, completions dropped below the 300 mark, representing a decline of 40 from the preceding week. Oil wells were off 26 and dry holes 17 while there were 3 more gas wells. Activity, as represented by completions, is now barely more than half as large as it was last year. At the same time, production was reduced last week to the lowest level since 1939. There are numerous reports of increased drilling locally, but this is offset by lessening activity in other sectors. With production dropping, in part because of diminished demand but mostly because of transportation difficulties, there is not much immediate need for more drilling. This is, however, a temporary condition and may be changed within a few months to one of shortage.

Being on the end of the transportation system remote from the largest markets, Texas and New Mexico operators face increasing difficulties and it is in this area that prospecting is proving most successful. The Fullerton and Barnhart pools in West Texas promise to be major developments and tests are now being made of the lower Permian pay in Big Lake to determine whether or not some of the small producers in the Big Lake lime should be deepened to it. Despite numerous discoveries in recent years, Jackson County shows little sign of being completely prospected as new pools are being opened almost weekly. The Wilcox trend play continues to show increasingly favorable results and production is showing up in new sectors almost every week. In the South Texas area, discoveries, any one of which may open up major production, are being reported with considerable frequency. On the other hand, the areas where there is greatest demand and where the oil can be moved show a continued decline of discoveries over production. The Peace Creek trend in Kansas and the Pauls Valley area in Oklahoma are the only important developments so far this year. In Illinois, discoveries are restricted to what appear to be relatively unimportant pools. Only in Michigan is newly found oil holding its own with production. The latest find, at Riverside in Missaukee County, not only promises to be of importance but it extends the basin play farther to the northwest along a new trend and much wildcatting will result from it if it lives up to current expectations.

NORTH CENTRAL TEXAS: Another spot in the Rogers & Rogers area of Montague County has been opened for production, while northeast of Bowie a wildcat is reported making a good showing in a sand tentatively identified as Simpson (p. 96.)

MICHIGAN: The oil well flanking the Riverside gas field in Missaukee County which was reported last week is showing improvement and a major pool here is a distinct possibility (p. 94).

LOUISIANA GULF COAST: West Gueydan has joined the list of deep producers with a new pay at 10,776-99 ft. A new shallow gas sand has been found at Pointe au Fer, Terrebonne Parish (p. 91).

CALIFORNIA: Wildcatting is on the increase in Fresno County in an attempt to push major production in the San Joaquin Valley farther to the north. The Domengine zone of the Eocene and the Cretaceous are the principal objectives. In the Los Angeles Basin, activity interest is confined to the new Turnbull Canyon and Buena Park fields. In the former, the third test is about to be completed (p. 84).

TEXAS GULF COAST: An 11,000-ft. test in Austin County is believed to have found favorable showings in the Wilcox, although definite information is lacking. Phillips' test on the flank of the Millican dome, Brazos County, is still trying for production after a blowout. Another Frio sand field is brought in in Jackson County and still another is testing (p. 88).

ILLINOIS: Operators are hoping that the promised exceptions to M-68 will materialize in order to reverse the present decline in production. Showings are reported in the Aux Vases in a test northwest of the Benton field and in the Benoist in Wabash County between Allendale and the South Lawrence fields (p. 95).

WEST TEXAS: With completion of the third well extending the pool ½ mile west, the Fullerton area in Andrews County is taking on major importance. Other wildcats in the same county are showing oil. It is expected that some of the Big Lake lime producers will be deepened to the new 4,300-ft. pay (p. 86).

OKLAHOMA: Another small pool has been opened in Okfuskee County while two good gassers have opened new areas in the eastern part of the state. Hotulke has been extended 1 mile west and Pure's outpost southeast of the Pauls Valley discovery reports a stain in a Pennsylvanian sand (p. 93).

EAST TEXAS: Scattered wildcats are seeking to extend Smackover lime production into the fault-line area (p. 97).

WEST CENTRAL TEXAS: The largest well to date in the Novice pool is reported. A wildcat near Blackwell, Coke County, offsetting an old well which reported a noncommercial showing is preparing to test (p. 96).

SOUTHWEST TEXAS: Sun's fourth discovery this year is in prospect as a Starr County wildcat found oil on drill-stem test on the Frio-Vicksburg section. The Wilcox section at South Caesar is showing considerable dip. (p. 90).

CANADA: The most northerly producer in the Turner Valley field, which is gradually being extended in that direction, has the lowest gas-oil ratio of any well in the field. Production is holding up well in the Tilley pool opener in southwestern Alberta (p. 97).

KANSAS: Continued development along the Peace Creek Viola trend in Reno County is gradually linking the different pools. Last week, Peace Creek and Northeast Peace Creek were joined by two producers. Production is now obtained over a stretch of 7½ miles (p. 89).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended May 2, 1942)

	Oil	Gas	Dry	Total	Footage	Tll. comp. to date 1942	1941
N. Y., Pa., and W. Va.	53	15	3	71	146,297	1,310	1,556
Ohio	6	8	2	16	39,134	323	491
Indiana	3	0	6	9	19,151	130	140
Kentucky	1	3	1	5	9,122	141	191
Illinois	8	0	11	19	51,405	574	966
Michigan	4	1	3	8	22,366	227	277
Kansas	13	2	8	23	76,552	522	567
Nebraska	0	0	0	0	0	17	29
Missouri, Iowa	0	0	0	0	0	7	3
Oklahoma	8	2	8	18	68,786	475	483
Texas:							
North Central Texas	6	2	11	19	63,136	477	893
West Texas	23	0	6	29	120,932	624	634
Texas Panhandle	6	0	1	7	21,940	178	167
East Texas	4	0	1	5	21,523	160	393
Texas Gulf Coast	8	1	1	10	73,051	309	343
Southwest Texas	4	3	12	19	101,178	507	542
Total Texas	51	6	32	89	401,760	2,255	2,954
North Louisiana	7	0	4	11	46,114	197	196
Louisiana Gulf Coast	2	1	3	6	44,968	203	282
Total Louisiana	9	1	7	17	91,082	400	478
Arkansas	3	0	1	4	27,277	50	57
Mississippi and Southeast	0	0	2	2	14,961	33	80
Montana	1	0	2	3	7,740	53	75
Wyoming	0	0	0	0	0	30	39
Colorado, Utah	0	0	0	0	0	4	11
New Mexico	4	0	0	4	13,833	83	93
California	5	0	1	6	41,564	284	342
Total United States	169	38	87	294	1,030,930	6,918	8,832
Total previous week	195	35	104	334			
Week ended May 3, 1941	390	53	129	572			

Wildcatting Concentrated in Fresno County Sector

By L. P. STOCKMAN

LOS ANGELES, Calif. — Fresno County is receiving careful attention from prospectors who for several years have centered their activities in Kern County and it may be possible that some additional commercial accumulations may be found before the end of the present year.

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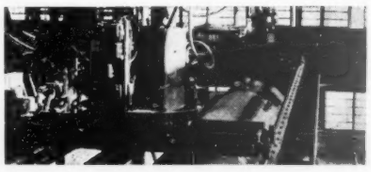

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Amerada Petroleum Corp., which has enjoyed a very successful exploratory search for new fields, is preparing to drill a new wildcat in the Wheatville district of Fresno County and an early spud is anticipated. Amerada's initial test in this district will be drilled on the Truman property in 6-17s-18e, and actual drilling will be done by Bell & Loffland. The Wheatville area presents considerable merit, not only because the seismograph survey was favorable, but also because it is a likely interval and the projecting of likely intervals is an important factor inasmuch as California fields are found, as a general rule, along well-defined lines of folding.

The Cantua district of Fresno County has come back into the limelight again with Richfield Oil Corp. drilling a wildcat on the McDonald estate in 32-16s-16e, and Shell Oil Co., Inc., making plans to drill a test in 21-15s-15e. Western Gulf was the first operator to consider the productive possibilities of the Cantua region on a broad scale and for several years had several hundred thousand acres under lease. The company drilled four dry holes and spent over $1,000,000 in development work and lease rentals before quitclaiming most of the properties. The objective of wildcats in the Cantua area is the Domengine, which in one of Gulf's wells showed productive possibilities on a small scale, although it is quite likely that Richfield and Shell may prospect ahead in their respective wildcats if this horizon proves barren. Jergins Oil Co. should reach the objective in its Panoche district wildcat within the next 2 weeks and the future importance of this area may be determined shortly thereafter. The Cretaceous is the objective of 3 Cheney Ranch of Jergins Oil Co. and because rocks of this age do not as a rule produce commercially in California the outcome of work will be watched with considerable interest. In addition to this, the operator would like to know whether it has a distillate field or is located on the edge of a normal black-oil field. The initial discovery well showed a very high gas-oil ratio and although most of the gas cap is blanked off the well is still producing a small amount of condensate each day. The present well is the third to be drilled by Jergins Oil Co. in the Panoche district, there being an extended period between the second and third wells during which a study was made of the Cretaceous.

SAN JOAQUIN VALLEY COMPLETIONS

Mount Poso, Kern County: General Petroleum Corp. 19 Heisen, 16-27s-28e, pumped 132 bbl., 15.4-gravity, 2 per cent cut, T.D. 1,900 ft., perf. 1,860-99 ft., completed in the Vedder zone of Miocene age.

Shafter, Kern County: Continental Oil Co. 1 Neuman, 36-27s-24e, flowed by heads 104 bbl., 39.1-gravity, 0.2 per cent cut, 125,000 cu. ft. gas, 64/64-in. bean, pressures 40/980 lb., T.D. 12,857 ft., A-2 sand 12,523 ft., lower Vedder of Miocene age 12,768 ft., completed in lower Vedder.

Shafter wildcat district, Kern County: General Petroleum Corp. 51-15 S.P., 15-28s-24e, dry, T.D. 14,252 ft., Mulinia 4,422 ft., chert 9,726 ft., Olcese 11,850 ft., Vedder zone of Miocene age 13,752 ft.

Newhall Potrero Test Delayed by Fishing Job

Barnsdall Oil Co. ran into a fishing job late this week when a twistoff left 21 stands of drill pipe and bit in the bottom of 31 Rancho San Francisco in the Newhall Potrero field at 7,105 ft. As a result of this fishing job, progress will be retarded and consequently it may be another 2 weeks before drilling operations are concluded and pipe landed. Barnsdall 31 Rancho San Francisco topped the first Sherman or upper Modelo zone at 6,685 ft. and the third Modelo zone was tentatively placed at 6,890 ft. The second Modelo was drilled through in the interval at 6,790-6,890 ft. and while it did not carry much oil the first Modelo looked very good. The third Modelo zone is the most productive in the Newhall Potrero field and consequently Barnsdall will complete the well in that horizon if the present mechanical trouble can be overcome and drilling resumed. It is interesting to note that the first Modelo zone was found by Barnsdall slightly higher than the same zone was found in 1 Ferguson about 1 mile to the southeast and this tends to indicate the eastern end of the field is relatively flat and also tends to confirm the expectation that Barnsdall's holdings between present production at Newhall Potrero and the Ferguson well will ultimately be found productive.

Water Shows in Gato Ridge Outpost

In the Gato Ridge field where Republic Petroleum Co. had cored some oil sand in a shale interval in 1 Price, the company has found it necessary to place a 60-ft. plug in the bottom of the hole to exclude bottom water. This well, on a bailing test, showed some sulfur water and oil but a check showed the water was entering in the lower 50 ft. of the hole. If this well is successfully completed, it will extend the productive limits of the Gato Ridge field and lead to additional drilling in an area that has been regarded as being off structure. In Ventura County, interest in development work centers in the Rincon field where Chanslor-Canfield Midway Oil Co. is drilling a deep test and in the Temescal district where Pacific Western Oil Co. is believed to be drilling in the third zone in 11 Temescal in 4-4n-18w, at 3,350 ft.

COASTAL DISTRICT COMPLETIONS

Santa Maria Valley, Santa Barbara County: Capitol Co. 5 Gallison fee, 26-10n-34w, flowed 575 bbl., 14.1-gravity, 5 per cent cut, T.D. 5,220 ft., 140-mesh perf. 4,654-5,218 ft., Sisquoc 3,848 ft., Santa Margarita 4,615 ft., Monterey 4,788 ft., chert 4,865 ft., bentonitic brown sand 5,185 ft., buff and brown sand 5,215 ft.

Third Turnbull Canyon Well Nears Test

Continental Oil Co. should be ready soon to make a production test in its third well in the Turnbull Canyon field of Los Angeles Basin which the company discovered late last year and the industry will watch developments with interest due to the difference in productivity of the first two completions in the field.

Texas Co. is preparing to start a second well in the Buena Park field of Orange County where it completed a small but commercial well early this year. The company's new well will be designated as 1 Buena Park Unit 1 and it will be drilled in 6-4s-10w. In the meantime, the company is drilling ahead in 2-A McNally in La Mirada district which is located west of the West Coyote field but still has some distance to go before reaching the critical depth. Because of the company's success in the Buena Park area, the industry will watch with interest the outcome of work at La Mirada. The present wildcat of Texas Co. in the La Mirada district should determine definitely whether the West Coyote structure comes up again west of the syncline as other wildcats have failed to find it to the south of present drilling. The McNally property was first found productive back in 1939 when Severns Drilling Co. drilled and completed an extension well west of properties developed by Standard Oil Co. This portion of the McNally property was the most easterly end of the parcel and Severns Drilling Co. extended the productive limits of the

(Continued on Page 98)

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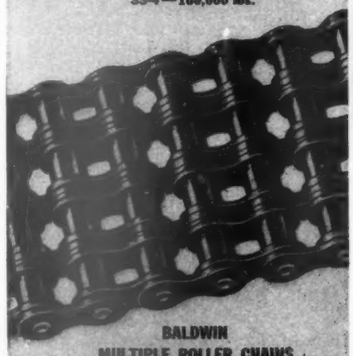

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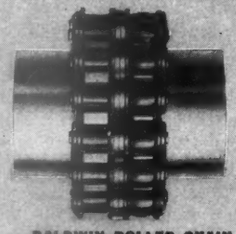

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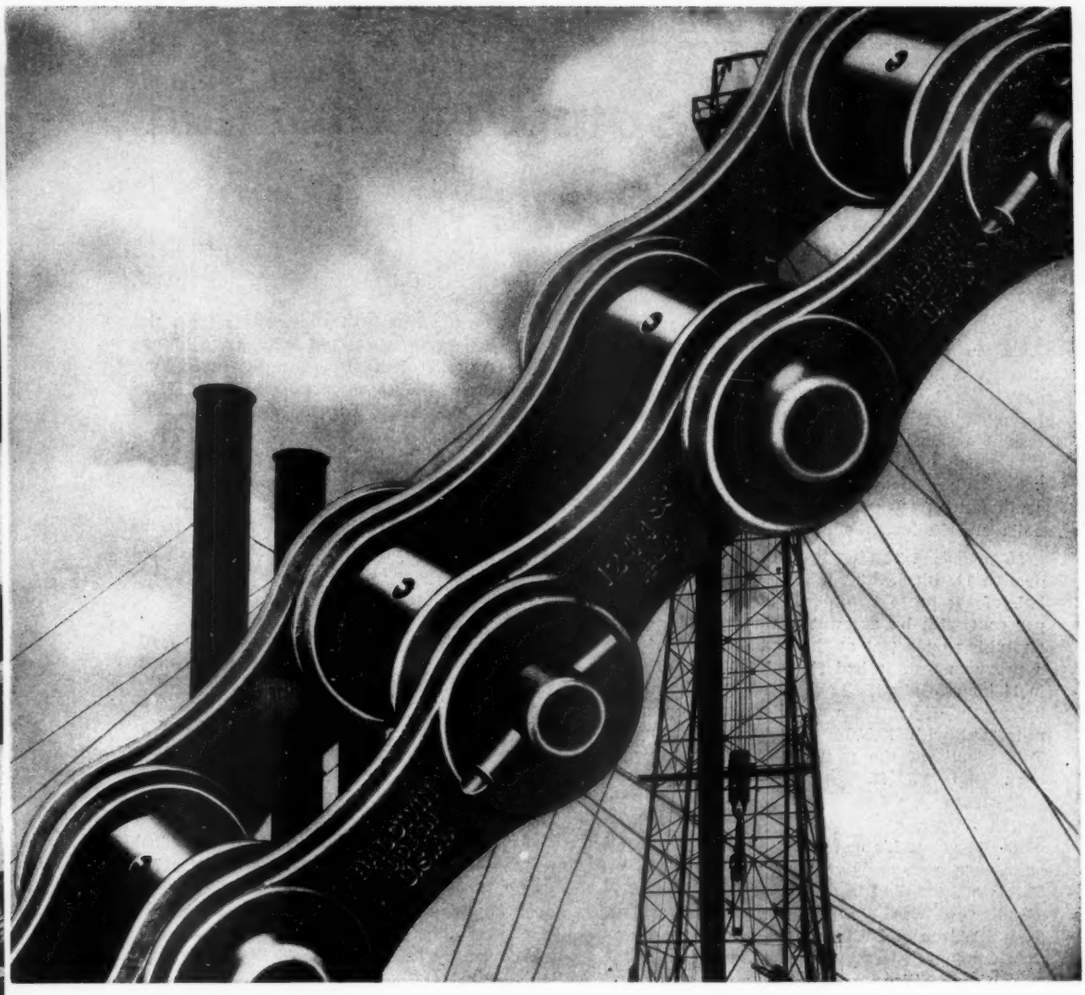

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Good Wells Spur Development Of Fullerton Pool

By ROBERT INGRAM

MIDLAND, Tex.—Development of the Fullerton pool, a new area far removed from production in northwest Andrews County, reached a fast pace last week. Magnolia Petroleum Co. brought in the third well in the pool and extended production ½ mile west. Fullerton Oil Co., which opened the pool in January of this year, took a potential on the second well, a southwest offset to the discovery. And both Magnolia and Fullerton announced new wells.

Magnolia's extension well, the 1-11-37 Ralph, Section 11, Block A-37, P.S.L. Survey, flowed 246 bbl. of oil in 15 hours and 20 minutes, cut 14 per cent with b.s. and water, through 1-in. choke on tubing on a test at the end of the week. On a previous test, it had flowed 141 bbl. of fluid in 11 hours. Only 4,000 gal. of acid had been used before the first test was taken, and operators re-treated with 10,000 gal. before testing again. Total depth of the well was 7,306 ft., plugged back from 7,403 ft.

Offset to the discovery, Fullerton 2 Wilson, Section 15, Block A-32, P.S.L. Survey, was taking potential at week's end after flowing 40 bbl. an hour on a gage early in the week from 7,300 ft. This well, too, had been acidized.

Fullerton was skidding the rig, meantime, from 2 Wilson to 4 Wilson, one location west, and then announced location for its fourth test in the area, the 5 Wilson, 660 ft. from the south and east lines of Section 15. The No. 5 will be the first well east of the discovery and will be 1,020 ft. east by southeast of that well. Magnolia's new operation will be the 2 Ralph, 1,980 ft. from the south and east lines of Section 11, 1,867 ft. northwest of 1 Ralph.

Besides opening a broad new area to production, the Fullerton pool has opened a new pay horizon for the county. Production is from the Clear Fork section of the Permian, while hitherto all production has come from the Big lime trend to the east, except for the San Andres lime pay at the West Andrews pool in the southwestern part of the County.

Following the discovery here, Humble Oil & Refining Co. started 1 H. O. Sims, Section 24, Block A-29, P.S.L. Survey, 13 miles west. Last week the Sims was drilling below 4,127 ft. in anhydrite. From an elevation of 3,495 ft., it topped the brown lime at 3,740 ft.

South Andrews Wildcats

Besides the development at the Fullerton area, Andrews County has had a fast exploratory campaign in the southwest in the vicinity of the Emma and Fuhrman pools. One of the wildcats in this section, Mascho Oil Co. 1 Sun-University, Section 27, Block 10, University land, 2 miles northwest of the Emma pool, was in the testing stages.

After being shut down for 2 weeks, the well began swabbing early in the week. First it swabbed dry. Then it was shut in for 18 hours. During that time the hole filled 625 ft. with fluid. When swabbing was resumed, some water was recovered at first, then in 4 hours, 17 bbl. of free oil was recovered. The well swabbed dry at the end of the period and again was shut in pending orders.

The oil-bearing zone is from 4,373-4,514 ft. and is approximately 200 ft. below the pay zone in the Emma pool.

North from this test toward the West Fuhrman pool, Siemoneit Drilling Co. 1 University, Section 10, Block 10, University Survey, was reaming after coring to 4,418 ft. in lime and anhydrite. Core at 4,388-4,406 ft. obtained lime bleeding oil in spots.

NORTHERN WEST TEXAS COMPLETIONS

Fields

Cedar Lake, Gaines County: George P. Livermore 1 Gus White, 690 ft. from S line and 1,980 ft. from E line Sec. 4, Blk. H, D.&W. Sur., elev. 3,063 ft., swabbed 587 bbl. natural, pay 4,597 ft., T.D. 4,752 ft.

Fullerton, Andrews County: Fullerton 2 H. M. Wilson, 660 ft. from S and E lines of SW Sec. 15, Blk. A-32, P.S.L. Sur., west offset to 1 Wilson, flowed 949 bbl. through 1-in. tubing choke, acid, pay 6,825 ft., anhydrite 1,690 ft., T.D. 7,300 ft.

Iatan-East Howard, Mitchell County: Magnolia 13 Mary Foster, 1,980 ft. from E line and 2,038 ft. from N line Sec. 7, Blk. 29, Twp. 1s, T.&P. Sur., east-edge test, elev. 2,333 ft., pumped 120 bbl., acid, pay 2,360 ft., T.D. 2,825 ft.

Slaughter, Cochran County: Continental 2-58 Dean, 5,855 ft. from S line and 3,347 ft. from E line Lge. 58, Martin C.S.L. Sur., elev. 3,693 ft., flowed 384 bbl. through tubing after acid, pay 4,917 ft., T.D. 4,975 ft.

Magnolia 29 Woodley, elev. 3,654 ft., flowed 545 bbl. through 3-in. casing outlet after acid, pay 4,910 ft., T.D. 4,960 ft.

Superior 4 Dean, 6,695 ft. from W line and 440 ft. from S line of lease in Lge. 57, Martin C.S.L. Sur., elev. 3,690 ft., flowed 127 bbl. through casing after acid, pay 4,927 ft., T.D. 4,014 ft.

Slaughter, Hockley County: Humble 2 W. A. Coons, 4,887 ft. from N line and 530 ft. from W line Sec. 11, Blk. X, P.S.L. Sur., elev., 3,514 ft., flowed 778 bbl. through tubing after acid, pay 4,910 ft., T.D. 5,010 ft., P.B. 5,002 ft.

Magnolia 19-F Mallett, 580 ft. from S and E lines Lab. 8, Lge. 49, Edwards C.S.L. Sur., elev. 3,604 ft., flowed 1,703 bbl. through 3-in. casing outlet after acid, pay 4,975 ft., T.D. 5,023 ft.

Texas 123 Slaughter, elev. 3,576 ft., flowed 408 bbl. oil plus 4 per cent water through tubing after acid, pay 4,990 ft., T.D. 5,025 ft.

Texas 128 Slaughter, elev. 3,562 ft., flowed 1,399 bbl. through casing after acid, pay 4,970 ft., T.D. 5,037 ft.

Texas 129 Slaughter, 580 ft. from N and W lines Lab. 84, Lge. 38, Zavalla C.S.L. Sur., elev. 3,551 ft., flowed 2,131 bbl. through casing after acid, pay 4,945 ft., T.D. 5,026 ft.

Texas 130 Slaughter, 580 ft. from N and E lines Lab. 86, Lge. 38, Zavalla C.S.L. Sur., elev. 3,568 ft., flowed 1,642 bbl. through casing after acid, pay 4,975 ft., T.D. 5,028 ft.

Texas 131 Slaughter, 580 ft. from N and E lines Lab. 85, Lge. 38, Zavalla C.S.L. Sur., elev. 3,549 ft., flowed 2,462 ft. through casing after acid, pay 4,930 ft., T.D. 5,014 ft.

Big Lake Well Deepened To New Permian Zone

Possibility of a deepening program in the Big Lake field of Reagan County hinged to a large extent on the outcome of testing at an old well in the northeast edge of the field last week. The well was Big Lake Oil Co. 20-C University, originally the 117 University, 1,243 ft. from the south line and 466 ft. from the west line of Section 24, Block 9, University Survey. It is 1,692 ft. northwest of the Big Lake 19-C University which recently opened the 4,300-ft. Permian lime pay in the field.

The 20-C University had originally been completed in the 3,000-ft. zone (first pay in the field). It had been deepened to 4,450 ft. Coring continuously from 4,355-4,450 ft., the well logged oil-stained sand from 4,413-26 ft. It ran a 50-minute drill-stem test from 4,225-4,450 ft. and recovered 50 ft. of mud with a very slight showing of oil and no gas or water.

Three-inch tubing was then run, but the well showed no oil on a swabbing test and operators pulled tubing preparatory to reaming core hole and drilling ahead.

Todd, Barnhart, and Other Pools

Amerada 2-A J. S. Todd estate, ¼-mile-west extension to Todd Deep field in Crockett County, was flowing 250 bbl. in 4 hours natural from 5,800-5,904 ft., before taking official tests. . . . Fourth producer in the Barnhart field was Amerada 1-RA University, 1,980 ft. from the north line and 710 ft. from the east line of Section 4, Block 48, University Survey, which was flowing 254 bbl. a day from Ordovician pay at a total depth of 9,128 ft. It is 1 mile west of the discovery well. . . . Humble Oil & Refining Co. 1-D Owens, Section 15, Block GG, H.E.&W.T. Survey,

(Continued on Page 98)

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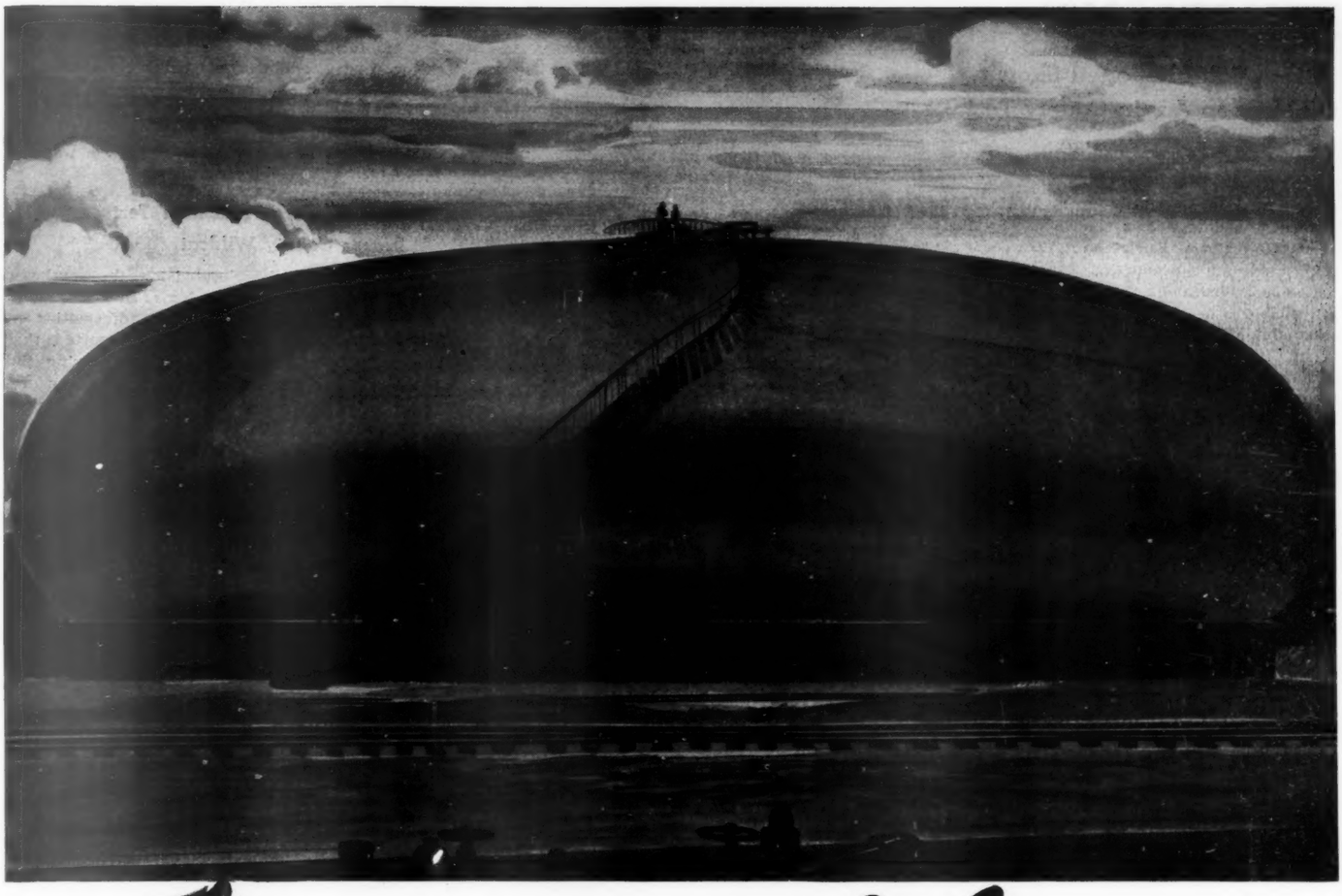

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TEXAS GULF COAST

Wilcox Sand Reported Showing Oil in Deep Austin County Test

By F. L. SINGLETON

HOUSTON, Tex.—Shell Oil Co., Inc., 1 Hinze, located in the Sealy area, Austin County, loomed as a new Wilcox sand discovery for the Texas Gulf Coast district as preparations were being made for a production test. Like many of the wells drilled along this trend, no information is available as to what showings have been logged, other than liner has been cemented for testing below 11,000 ft. Seven-inch casing was cemented at approximately 10,750 ft., and it is assumed that favorable showings have been logged up the hole. This is the deepest test ever drilled in Austin County and whether or not production is obtained, valuable information has been secured which will be used in future operations.

Superior Oil Co. of California which has established production from several sands in the Wilcox at Lake Creek field, Montgomery County, and is now engaged in drilling a deep test about 5 miles east of the field, announced location for another 12,000-ft. test being 1 Eola Frost in the A. Hodge Survey. The location is about 2½ miles northwest of the company's 1 McMahan which is drilling in shale below 10,158 ft. This test is being drilled jointly with the Atlantic Refining Co.

H. C. Cockburn 1 Gayle, another interesting Wilcox test located in Grimes County, is shut down for orders at a total depth of 7,730 ft., and the well may be drilled deeper. The Wilcox formation was topped the previous week at 7,295-7,305 ft., and showings of oil and gas were logged in a broken section at intervals from 7,435-93 ft. Additional cores were taken to the total depth, but no further showings were reported. In the same county, and located north of the town of Navasota, Magnolia 1 Brigance, R. Ray Survey, is drilling in sandy shale below 8,150 ft. At the present depth, the well is thought to be in the Wilcox, although the top of the section was not available.

Blowout Hinders Production Test At Brazos County Wildcat

Phillips 1 Jericho, located on the southeast flank of the Millican salt dome, Brazos County, continues to attract attention, but information on the well is not available. It is reported that the well blew out for 10 minutes during the week while testing through a new set of perforations and was brought under control by pumping in heavy mud. After the well was killed, the casing is said to have been perforated for the fourth time, and on a production test, the well showed salt water. This is the third well to be drilled on the structure and if production is obtained it will open the first field for the county. Total depth is 3,559 ft., and sand section is reported to be approximately 34 ft. in thickness, of which the bottom part is said to be salt-water sand.

In Jackson County, J. B. Cofee 1 Mauritz, 2 miles southwest of the Mauritz field, flowed at the rate of 90 bbl. of oil plus 7 per cent salt water through ⅛-in. choke to open another Frio sand field for the county. The Frio formation was topped at 5,259 ft., and production is through perforated casing opposite oil sand at 5,447-62 ft. Additional development will have to be undertaken before the value of this new strike can be ascertained. The structure may be very similar to that of the Mauritz field which is very faulted, resulting in spotted production.

Approximately 2 miles northwest of the above well and about 1 mile south of the Ganado field, Gulfboard Oil Co. was preparing to retest 1 Harmon after the well flowed 5 bbl. of fluid per hour through ⅛-in. choke of which 80 to 90 per cent was oil and 10 to 20 per cent salt water. Tubing pressure was 500 lb. The test in the 5,300-ft. section followed an earlier test at 5,551-55 ft. which recovered 4,000 ft. of salt water. Whether or not the 5,300 ft. sand correlates with one of the top sands in the Ganado field is not known, but it is believed at this time to be located on a separate structure. Regardless of whether this is true, the showing of the above wells is expected to result in considerable drilling in the area which should determine the importance of the structures at an early date.

Looney's Branch Field

Drilling operations in the new Looney's Branch field, Jackson County, were being increased with the completion of a second producer offsetting the discovery well. The new producer is Boyle et al 1 Stroubal which flowed 120 bbl. of oil per day through a ¼-in. choke from perforated casing at 5,404-40 ft. The same operators have started operation at 1 Hafner, while Louis Crouch has derrick up for 1 Stoner.

Atlantic 1 Cohn, an interesting wildcat located in eastern Harris County and just west of the Esperson dome, Liberty County, was abandoned after testing salt water through perforated casing at 3,410-30 ft. This well was drilled to a total depth of 9,505 ft., and possible production in the lower Yegua formation below 8,800 ft. was indicated, but no test was ever made due to mechanical trouble. Additional development is expected to be started in the area within the near future.

TEXAS GULF COAST DISTRICT
Fields

Fig Ridge. Chambers County: Sun 2-A S. W. Pipkin,
(Continued on Page 98)

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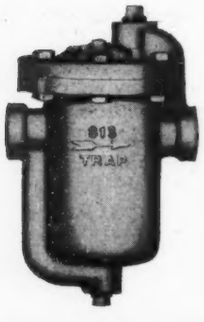

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KANSAS, NEBRASKA

Viola Lime Pools Joined In Reno County

By CARL HOOT

IN northwestern Reno County, Peace Creek and Northeast Peace Creek were joined last week by two wells, one of which is in the process of completion. This comparatively new area, producing from the Viola lime found at an average depth of 3,750 ft., is rapidly developing into a major field.

Starting with the Simpson 1 Snowbarger in 21-23-10w, discovery well of the Peace Creek pool, completed in July of last year, the play spread rapidly to the northeast and in December 1941 Northeast Peace Creek, Hendrickson and the Schweizer pools were opened. From Simpson Oil Co. 1-B Souder, prospective Southwest Peace Creek pool opener in SW NE NE 32-23-10w, wells have been drilled almost in a straight line northeast to the 1 Schweizer, a distance of about 7½ miles.

Connecting wells of the Peace Creek and Northeast pools this week were Republic Natural Gas 1 Werner, SW SE NW 15-23-10w, which flowed 152 bbl. of oil in 2 hours from Viola topped at 3,781 ft. This well extends the Peace Creek field ¼ mile north. Almost in the center of Section 15 and directly connecting the two pools, Cities Service 2 Heylmon swabbed 130 bbl. of oil after acidizing in the Viola lime at 3,783 ft. Further tests will be made after tubing is run.

Schweizer Pool Extension

On the northeast end of the trend, Hinkle Oil et al 2 Schweizer, SE SW NW 31-22-9w, ¼ mile west of the discovery well, topped the Viola at 3,698 ft. and was given state rating of 428 bbl. It is the second producer in the Schweizer pool. Last week, Helmerich & Payne 1 Laviellet, 2¼ miles northwest of the Schweizer pool, found the Viola dry at 3,603 ft. Four miles directly northeast of the 1 Schweizer, Appleman et al 1 Fair was a dry hole. Viola was topped at 3,668 ft. and total depth was 3,830 ft.

KANSAS COMPLETIONS

Fields

Baum, Rooks County: Palmer Oil 2 Baum, S½ NW NE 10-10-16w, dry, T.D. 3,325 ft., Topeka 2,780 ft., Lansing 3,039 ft.

Bemis, Ellis County: Champlin Ref. 3 Mock, SW NW NE 17-11-17w, 2,820 bbl., Arbuckle 3,349-58 ft.

Burnett, Ellis County: Nadd & Gussman 1 Lynn, NE SE SE 14-11-18w, pumped 160 bbl. in 8 hr., Arbuckle 3,453-70 ft.

Feltes, Barton County: R. E. Day 1 Theissen-Hoffman, N½ NE NW 14-16-12w, abandoned location.

Gibson, Cowley County: Sinclair Prairie 1 Jones, NW NE NE 29-34-3, pumped 312 bbl., Bartlesville 3,356-93 ft.

Greenvale, Russell County: Jones & Shelburne 7 Kuhnle, NE SW SW 4-15-12w, 2,220 bbl., Lansing 2,970-3,043 ft.

Holcomb Gas, Kearny County: Fin-Ker Oil & Gas 2 Hamlin, NE NE NW 30-24-34w, 23,250,000 cu. ft. gas, Herrington 2,440 ft. and Florence 2,463-71 ft.

Holcomb Gas, Kearny County: Fin-Ker Oil & Gas 5 Campbell, SE NW SE 19-24-35w, 35,500,000 cu. ft. gas, pay 2,379-2,594 ft.

Keesling, Rice County: R. Olsen 2 Peterson, S½ NW NE 4-20-9w, dry, T.D. 3,273 ft.

Kraft-Prusa, Barton County: Texas 1 Radenberg, N½ SW NE 5-17-11w, dry, T.D. 3,397 ft.

Leesburg, Stafford County: Continental 3 Mather, SE NE NW 12-25-13w, 3,000 bbl., swabbed 185 bbl. in 6 hr. before acidizing, Arbuckle 4,133-41 ft.

Lindsborg, McPherson County: M. & L. Oil Co. 1 Gustafson, SE SW 7-17-3w, pumped 616 bbl., Viola 3,366-71 ft.

McCollum Gas, Cowley County: I. W. Murfin 1-A Reynolds, NE NE NW 14-33-4, dry, T.D. 3,392 ft.

Peace Creek, Reno County: Republic Natural Gas 1 Werner, SW SE NW 15-23-10w, 3,000 bbl., flowed 152 bbl. in 2 hr., Viola 3,781-93 ft.

Cities Service 2-A Kreie, SW NW NE 28-23-10w, 3,000 bbl., flowed 22 bbl. an hr., Viola 3,799-3,809 ft.

Peace Creek, Northeast, Reno County: Leader Oil 5 Tonn, SW NE SE 11-23-10w, 3,000 bbl., flowed 32 bbl. in ½ hr. through tubing, Viola 3,761-62 ft.

Rahn, Cowley County: Jock Garden 2 Rahn, NW SE NW 13-34-5, flowed 205 bbl., Bartlesville 2,913-45 ft.

Ray, Phillips County: Cities Service 2 Solt, NE NW SW 31-5-20w, 966 bbl., LaMotte sand 3,636-43 ft.

Stafford, Stafford County: Stanolind 1 O'Connor-Schneider 2, S½ SE SW 11-24-12w, flowed 65 bbl. an hr. for 3 hr., Viola 3,841-47 ft.

Stoltenberg, Ellsworth County: Robertson & Hinkle 3 Stratman, SE NW NE 1-17-10w, dry, T.D. 3,323 ft.

Virgil, Greenwood County: Henderson Oil 7 Schneider, SE SW SW 9-23-13, pumped 8 bbl., Mississippi lime 1,780-1,820 ft.

Zenith, Reno County: A. M. Landon 1 Porter, W½ NW SE 7-24-10w, dry, T.D. 3,738 ft.

Miscellaneous

Cowley County: Mead Prod. 1 Hower, SE NW SE 32-33-3, dry, T.D. 3,329 ft.

Russell County: Phil-Han et al 1 Miller, NE cor. 22-15-12w, dry, T.D. 3,315 ft.

Recompletions

Jefferson County: William Smyth, SE NE 29-9-20, dry, T.D. 1,676 ft.

Marion County: Lorieaux & Harrington 1 Hanska, E½ NE NE 5-18-4, dry, T.D. 2,461 ft., old T.D. 2,441 ft.

Rice County: McPherson Drlg. 1-E Patton, SW SW NW 5-19-9w, pumped 55 bbl. oil and 2,000,000 cu. ft. gas, Lansing 2,953-58 ft., T.D. 3,765 ft., old T.D. 3,755 ft.

Russell County: Lariox Oil & Gas 1 Steinert, NW NW SW 21-15-15w, dry, T.D. 3,341 ft., old T.D. 3,095 ft.

NEBRASKA

ST. JOSEPH, Mo.—Skelly Oil Co. was on the way to granite at 1 Wiltse in the Dawson pool of Richardson County, E½ NW SE 10-1n-14e, after coring pay in both the Simpson lime and the Wilcox sand. Wilcox was topped at 3,230 ft. and 3 ft. of saturation was found. This well also had a very good show of oil in the Viola lime, but the oil went to water following acidization.

In the Barada pool of Richardson County, Skelly Oil Co. drilled 6 Roesch to 2,468 ft., total depth, and perforated casing. Oil filled the hole in 23 hours. Location is NW SW 36-3n-16e, west offset to Skelly 4 Roesch. This is the fifteenth well for the pool.

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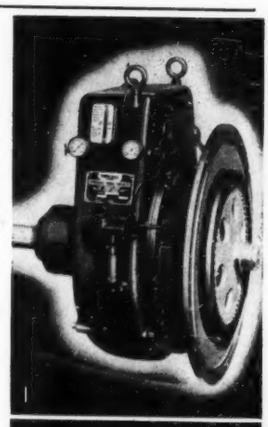

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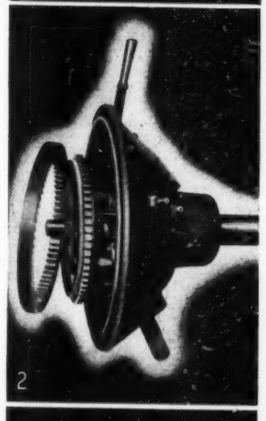

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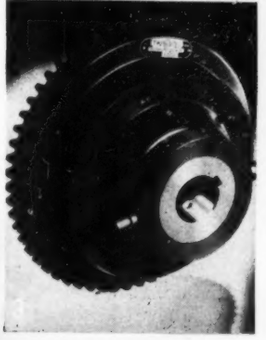

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SOUTHWEST TEXAS

Starr County Frio-Vicksburg Wildcat Shows Oil on Test

By F. L. SINGLETON

CORPUS CHRISTI, Tex.—Sun Oil Co. was attempting to open a new Frio-Vicksburg sand discovery in Starr County as preparations were made to test 1-A Montalvo, 3 miles due north of the Sun field. With the hole bottomed at 7,117 ft., 5½-in. casing was cemented at 6,087 ft., and the well is scheduled to be tested in a sand section at 6,090-97 ft. where a previous drill-stem test recovered several hundred feet of pipe-line oil in 20 minutes. The completion of this well as a producer would open the company's fourth discovery of the year and is expected to result in an increase in drilling along this particular sector of the county.

Pettus sand production in the Chaparosa field, Jim Hogg County, was extended several hundred feet as W. C. McBride 1 T. T. East was flowing at the rate of 8½ bbl. of oil per day through a $\frac{3}{16}$-in. choke. Tubing pressure was 150 lb., and casing pressure 340 lb. Completion was made in sand at 3,445-70 ft. Although production was opened in this area last year development of the structure has been limited to a few wells.

South Caesar Development

Operators interested in development of the South Caesar field, Bee County, were watching the progress of Atlantic 2 Grissom, 2,000 ft. south of the discovery well which is drilling below 5,000 ft., and is said to be running 90 ft. structurally lower than the discovery. This correlation is based on the top of the Pettus sand. In the meantime Jay Simmons 1 Cotton, located about 5,000 ft. northeast of the discovery well, is bottomed at 6,632 ft. where it is shut down for orders. This well is believed to be located on the edge of the structure although casing may be cemented for a production test as the result of a drill-stem test at 6,581-87 ft. which recovered 500 ft. of live oil. While the two wells may be completed for producers, they indicate considerable dip in the formation to the southeast and southwest and as a result future development is expected to be centered northward extending in a southwest-northeast direction.

In the southern part of Hidalgo County, Lockhart Oil Co. et al 1 Sweeney estate, the discovery well of a new gas-distillate field continues to be tested and on a recent gage, the well flowed 205 bbl. of distillate through a $\frac{5}{8}$-in. choke from perforated casing opposite two sands at 5,505-10 ft., and 5,353-58 ft. This well was completed several weeks ago, but no additional development has been started.

Five miles southeast of the town of Robstown, Nueces County, W. E. Masterson is making preparations to drill a 7,500-ft. test in Section 6, Pauls subdivision. The well is being supported by Continental Oil Co., Darby Petroleum Co., Pure Oil Co. and Fred W. Shield.

In Duval County, a Pettus sand test is expected to be started in the La Huerta grant by Frank N. Farley of Fort Worth who obtained a farmout on the V. M. de Vera lease from the Sun Oil Co. The proposed test will be supported by Bridwell Oil Co. which controls protection in the area.

Humble 1 Bishop, a wildcat located 6 miles northwest of Cotulla, La Salle County, is bottomed in lime at 8,783 ft. While side-wall cores are being cut, no shows have been reported and the well is scheduled to be abandoned. The bottom of the hole is reported to be in the Edwards lime, but the top of the section has not been released. Deep drilling in this county has been limited to a few wells, and the progress of this test has been watched with much interest. The well is located on a large block that has been worked extensively with geophysical instruments, and additional drilling might be undertaken.

Location for a Frio-Vicksburg sand test was announced for Jim Wells County by Kilgore Developers which is moving in material for 1 F. W. Strotman located in the Casa Blanca grant, 1 mile east of Orange Grove. The location is also about 3,500 ft. north of the H. R. Smith 1 Kohler, a gas well.

SOUTHWEST TEXAS COMPLETIONS
LOWER GULF COAST DISTRICT

Wildcats

Bee County: Celtic Oil Co. 1 Beck, dry, T.D. 7,511 ft.
Goliad County: Lewis Production Co. 1 Knocke, dry, T.D. 4,514 ft.
Victoria County: Rowan & Hope 1 Shear, dry, T.D. 5,503 ft.
Willacy County: Sunray 1 Kerlin, dry, T.D. 8,307 ft.

Fields

Orange Grove, Jim Wells County: Kilgore Developers 2 Koehn, old well, 113 bbl., ⅛-in. choke, top sand 5,090 ft., T.D. 5,100 ft.
Petronilla, Nueces County: Stanolind 1 La Prelle, dry, T.D. 9,108 ft.
Stratton, Jim Wells County: Humble 2 King, 64 bbl., $\frac{1}{4}$-in. choke, perf. casing 6,758-70 ft., T.D. 7,284 ft.
Sam E. Wilson 1-B San Antonio Joint Stock Co., gas well, no gage, perf. casing 6,656-76 ft., T.D. 7,260 ft.
Sam E. Wilson 3-A San Antonio Joint Stock Co., gas well, no gage, perf. casing 6,656-76 ft., T.D. 6,767 ft.
Sam E. Wilson 1 Union Central Life Insurance Co., 48,500,000 cu. ft. gas open flow, perf. casing 6,255-90 ft., T.D. 6,932 ft.

LAREDO DISTRICT

Wildcats

Duval County: W. C. McBride 2 Murphy, dry, T.D. 3,300 ft.
Jim Hogg County: Edwin J. Jones 1 C. W. Hellen, dry, T.D. 3,501 ft.
Webb County: Achning Daubert 1 Leal, dry, T.D. 3,227 ft.

Fields

Colorado, Jim Hogg County: Humble 65-B King, dry, T.D. 4,364 ft.

(Continued on Page 99)

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LOUISIANA GULF COAST

Showings Reported in Deep Sand On Flank of West Gueydan

By F. L. SINGLETON

NEW ORLEANS, La.—Deeper exploration in proven fields continued to highlight Louisiana Gulf Coast operations. The latest strike appears to have been made in the West Gueydan field, Vermilion Parish, where Pure Oil Co. was preparing to test 2 Vermilion Irrigation Co., a northeast outpost located in 41-12s-2w. With the hole bottomed at 11,000 ft., 5½-in. casing was cemented at 10,887 ft., preparatory to testing sand at 10,776-99 ft., which showed favorable indications on an electrical survey. This is the first deep test to be drilled in the area. Production was opened in this area in 1938 from sands at 6,600 ft. and 7,000 ft., but production has been limited to a few wells and the limits of production from this sand have been confined in a small area.

In the Lewisburg field, Acadia Parish, Stanolind 1 Dohmann, approximately 1 mile northeast of production, across the parish line in St. Landry Parish was scheduled to be tested after a string of 5½-in. casing was cemented on bottom at 10,782 ft. At this depth the well is about 500 ft. deeper than the discovery pay, and it is not known where the well will be tested as very little information has been released. All production developed to date has been gas-distillate from a depth at approximately 10,200-10,300 ft.

New Gas Sand Opened at Point Au Fer

Texas 1 State, located in the Point Au Fer gas-distillate field, Terrebonne Parish, has been completed for a dry gas well to open a new shallow sand for the structure. The well was drilled to a total depth of 9,264 ft., plugged back to 5,635 ft., and completed through perforated casing opposite sand at 5,608-30 ft. According to an electrical survey the sand section was logged at 5,600-50 ft. Initial production, flowing through a 12/64-in. choke was 1,800,000 cu. ft. of gas with tubing pressure 2,225 lb. Location is in 36-20s-11e, about 1½ miles from the discovery well which produces gas distillate from sand at 6,750-55 ft. Point Au Fer is a prospect which has received several deep tests, all with the exception of the discovery well having been abandoned. Apparently the area is very faulted and the importance of the area cannot be determined until further exploration is undertaken.

Additional exploration is planned for the Hayes area, Calcasieu Parish, by the staking of a new location by the Gulf Refining Co. which is in the process of retesting 2 Calcasieu National Bank that showed for a gas-distillate producer the previous week at 11,660-70 ft. The well was killed after the flowing pressure had declined from 3,950 lb. to 1,100 lb. At the end of the week a new test was being made at 11,646-56 ft. The new location is reported to have been made on the Amoskegg Bank & Savings Co. lease, just west of the present well.

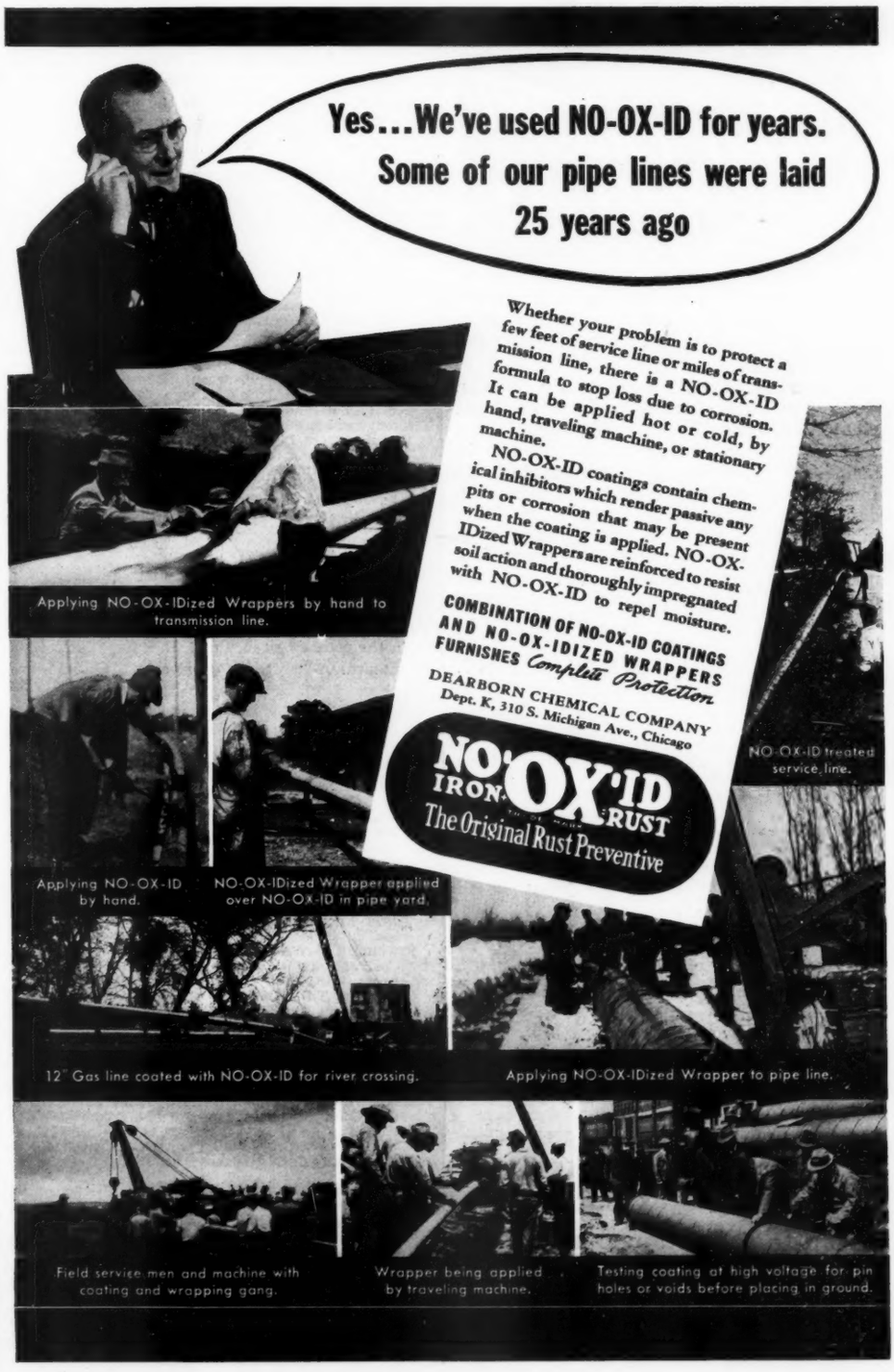
Pan American Production Co.'s initial test in the South Houma field, Terrebonne Parish, was abandoned as a dry hole at a total depth of 10,500 ft. to further define the limits of this structure to the southwest. The well was located in 67-18s-18e, and was drilled on a farmout from Shell Oil Co., Inc.

Exploration around the flanks of the old Napoleonville dome, Assumption Parish, was being resumed as George Echols et al moved in material for 1 Dugas & LeBlanc in 55-12s-13e. This is the third test to be drilled on this structure by the same operators in the past several months, and while no production has been developed, sufficient showings were logged to warrant setting casing. This is one of the few remaining old domes in the district in which flank development has failed to open production.

Wildcatting throughout the district was being increased as five new operations were reported while drilling was started on several locations that had been announced several weeks ago. Two of the new locations were in St. Landry Parish, one being Stanolind 1 Brewer-Neinstedt Lumber Co. in 17-4s-6e, and the other by Sun Oil Co. on the E. M. Boogne lease in 40-6s-4e, about 3 miles northeast of Opelousas. In Iberville Parish, and located in the Bayou Des Glaise area in 85-8s-8e, Humble Oil & Refining Co. staked location for 1 Alamo, while 13 miles southwest of Plaquemine, Phillips Petroleum Co. is rigging up for 1 E. B. Schwing in 15-10s-10e. On the St. James prospect, St. James Parish, a joint operation was made by the Cities Service Oil Co., and Skelly Oil Co. on the Karstein lease in 42-13s-16e. Actual drilling was started in Cameron, Orleans and Terrebonne parishes by Superior Oil Co. of California, W. T. Burton and Humble Oil & Refining Co., respectively.

Livingston and Pointe Coupee parishes, two areas which have been void of any large scale exploration program over a period of several years have two wells that have reached critical stages and hopes of finding production were not encouraging. Danciger 1 Dendinger, 4 miles south of Livingston, Livingston Parish, is drilling in shale below 8,618 ft., and it is reported that the well will be abandoned at 9,000 ft., if no shows are encountered. Humble 1 Pointe Coupee Land & Development Co., Pointe Coupee Parish, is bottomed at 8,949 ft. where drilling is temporarily halted due to a fishing job.

(Continued on Page 98)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SINCE 1866

APPALACHIAN FIELDS

Fayette Anticline Tests Finds Onondaga Abnormally Thick

PITTSBURGH, Pa.—Highlights of the week in the lower eastern fields include in West Virginia a new deep test and the rotary test reaching the Oriskany sand; in Pennsylvania, the Oriskany in a test on Chestnut Ridge with no showing and an extremely thick Onondaga section on the Fayette anticline.

SOUTHWEST PENNSYLVANIA

On Chestnut Ridge in South Union Township, Fayette County, New Penn Development Co., William E. Snee, et al 1 Heyn (Summit Hotel) was in the Helderberg at 7,019 ft. with no added gas showing. It was bottomed there and the rig may be moved to deepen No. 2 Heyn.

On the Fayette anticline in South Huntington Township, Fayette County, Peoples Natural Gas Co. is drilling at 7,782 ft. in the test on the Jacobs Creek Oil Co. or 465 ft. below the top of the Onondaga lime. The formation is still chert which appears unaccountably thick.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Kittanning Township: Pittsburgh Plate Glass Co. 1 Hardy Wright, 60,000 cu. ft. gas, Bradford sand 3,390-3,402 ft., gas 3,392 ft., T.D. 3,452 ft.

Local Co. 1 Fred Boarts, 18,000 cu. ft. gas, Tiona sand 2,930-59 ft., gas 2,935 ft., T.D. 3,519 ft.

Clarion County, Monroe Township: Owens Illinois Glass Co. 2 J. S. Barnhart, 33,000 cu. ft. gas, Thirty-foot and Hundred-foot sands, T.D. 2,865 ft.

Fayette County, Nicholson Township: Lingle & Upperman 2 Shroyer Bros., 100,000 cu. ft. gas, Big Injun 1,294 ft., gas 1,420 ft., T.D. 1,468 ft.

Greene County, Center Township: Manufacturers Light & Heat Co. 2 Clark Grinnage, 377,000 cu. ft. gas, Fifty-foot sand 2,756-2,800 ft., gas 2,770-74 ft., Gordon sand 2,909-51 ft., gas 2,923-26 ft., T.D. 2,957 ft.

Manufacturers Light & Heat Co. 1 J. C. Tustin, 79,000 cu. ft. gas, Bayard sand 3,254-71 ft., gas 3,255 and 3,270 ft., T.D. 3,290 ft.

Whiteley Township: Lewis, Pettit et al 1 Samuel Everly, 103,000 cu. ft. gas; Ganz sand 2,676-2,722 ft., gas 2,683-2,717 ft., T.D. 3,241 ft.

Washington County, South Franklin Township: Foley & Williams 1 John G. Clark, dry, T.D. 2,688 ft.

WEST VIRGINIA

In Freemans Creek district, Lewis County, Hope Natural Gas Co. topped the Oriskany sand at 6,898 ft. in the rotary test on the J. B. Lovett farm after an interval of 260 ft. of Corniferous lime. The sand is subsea 5,767 ft. Casing has been run and cemented in the Corniferous and the plug is now being drilled out.

WEST VIRGINIA COMPLETIONS

Boone County, Washington district: Pond Fork Oil & Gas Co. 9 fee, 81,600 cu. ft. gas, Big lime 2,129-2,326 ft., Injun 2,326-59 ft., Berea 2,811-43 ft., R.P. 200 lb., T.D. 2,863 ft.

Clay County, Henry district: Virginian Gasoline & Oil Corp. 1318 Brown, Swann & Goshorn, 6 bbl., Big lime 1,642-1,750 ft., Injun 1,750 ft., oil 1,765-91 ft., T.D. 1,791 ft.

Buffalo district: Pittsburgh & West Virginia Gas Co. 7823 Elk River Coal & Land Co., 250,000 cu. ft. gas, Injun sand, T.D. 2,208 ft.

Pittsburgh & West Virginia Gas Co. 7843 Elk River Coal & Land Co., dry, big lime 2,141-84 ft., Big Injun 2,184-2,306 ft., show gas 2,194 ft., water 2,194 ft., T.D. 2,356 ft.

Gilmer County, DeKalb district: Blaine Engle 3 O. C. Davis, dry; salt sand 1,435-1,535 ft., Big lime 1,798-1,855 ft., Big Injun 1,855-1,952 ft., T.D. 1,955 ft.

Kanawha County, Poca district: South Penn Natural Gas Co. 2 Ray-Salyers, 20 bbl. and 250,000 cu. ft. gas, Big lime, T.D. 1,564 ft.

Pleasants County, McKim district: Jones Farm Oil & Gas Co. 1 Elizabeth Jones, 5 bbl., Big lime, T.D. 1,790 ft.

Putnam County, Teays Valley district: Teavee Oil & Gas Co. 1 J. E. Hodges, 280,000 cu. ft. gas, gas 1,050-53 ft., T.D. 1,055 ft.

Upshur County, Buckhannan district: Pittsburgh & West Virginia Gas Co. 7846 Eva C. Allman, 51,000 cu. ft. gas; Big lime 1,755-1,851 ft., Injun 1,851-1,977 ft., Benson sand 4,450-66 ft., gas 4,453-62 ft., shot 4,451-64 ft., R.P. 820 lb., T.D. 4,488 ft.

ORISKANY GAS FIELDS

Jackson County, Ravenswood district: Columbian Carbon Co. 1628 Jackson County Bank, 1,494,000 cu. ft. gas, Big lime 1,840-1,975 ft., Injun 1,975-2,030 ft., Berea 2,440-58 ft., Corniferous 4,977-5,092 ft.,

(Continued on Page 99)

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OKLAHOMA FIELD REPORT

Pauls Valley Outpost Reports Sand Above Objective Stained

By CARL HOOT

COMPLETIONS in Oklahoma were more encouraging this week than they have been since the Pauls Valley discovery. New production was found and important areas were extended. Pure Oil Co. 1 Price, southeast of the discovery well recovered stained sand at 3,724 ft. On last report, it was drilling below 4,000 ft. In addition to the wells listed below, five old wells, in as many counties, were recompleted.

One of Oklahoma's most important new pools, the Hotulke field of northeastern Pottawatomie County, was extended 1 mile west by Atlantic 1 Krauch (see completion table). Two other good producers were also added to this area.

Two gas discoveries were added to eastern Oklahoma fields. In northern LeFlore County, Western Oklahoma Gas Co. 1 McBee flowed 25,000,000 cu. ft. of gas daily with a rock pressure of 1,020 lb. Gas sand was found at 5,095 ft. The other well, Republic Natural Gas Co. 1 McGrath. Pittsburgh County. flowed 4,578,000 cu. ft. of gas daily.

New production was found in northern Okfuskee County when Doak and Hughes 1 Hensley, NW SE NW 21-13-9, pumped 17 bbl. of oil a day from sand topped at 3,180 ft.

Payne County Wildcat Testing

A wildcat test being watched with considerable interest is Portable Drilling Co. 1 School, SW NE NE 36-18-1, in southwestern Payne County. On last report the well swabbed 43 bbl. of oil and 36 bbl. of water in 3 hours after perforating from 4,746-51 ft.

OKLAHOMA COMPLETIONS

Wildcats

Kiowa County: Beckwith-Hinton 4 Hipp, NW SE NW 4-6-16w, dry, T.D. 1,354 ft., Hunton 663 ft., Sylvan 997 ft., Viola 1,265 ft.

Wilcox 1 Grieser, SW SW NE 35-7-18w, dry, T.D. 1,465 ft.

LeFlore County: Western Oklahoma Gas 1 McBee, S½ SE NE 29-9-24, 25,000,000 cu. ft. gas, sand 5,095-5,240 ft.

Okfuskee County: Doak & Hughes 1 Hensley, NW SE NW 21-13-9, pumped 17 bbl., sand 3,180-3,204 ft., discovery.

Payne County: Superior Oil 1 Knipe, SW SW NE 9-17-2, dry, T.D. 4,882 ft., Mayes 4,440 ft., Woodford 4,570 ft., Hunton 4,615 ft., Sylvan 4,705 ft., Viola 4,780 ft., dolomite 4,835 ft., Wilcox 4,865 ft.

Mutual & Coralena 1 Tignor, NE NW NW 19-20-4, dry, T.D. 4,385 ft., Layton 2,633 ft., Oswego 3,550 ft., Prue 3,620-3,787 ft., with show oil, Mayes 4,085 ft., Woodford 4,203 ft., Misener 4,263 ft., Viola 4,277 ft., Dense 4,296 ft., Wilcox 4,343 ft.

Pittsburg County: Republic 1 McGrath, SW SW NE 3-3-15, 4,578,000 cu. ft. gas, main pay 2,781-84 ft., T.D. 2,808 ft.

Pottawatomie County: Smith Bros. 1 Fundis, SW NE 33-8-3, T.D. 5,456 ft., Woodford 4,640 ft., Hunton 4,670 ft., Viola 5,150 ft., Dense 5,205 ft., dolomite 5,248 ft., second Wilcox 5,403 ft.

Stanolind-Amerada 1 Malone, SW SW 4-9-4, dry, T.D. 5,165 ft., Earlsboro 4,220 ft., Mayes 4,485 ft., Woodford 4,580 ft., Hunton 4,722 ft., Dense 4,922 ft., dolomite 4,952 ft.

Fields

Crescent, Logan County: Fain-Porter 1 Ferguson, SW SW SE 27-17-4w, flowed 834 bbl., Layton 4,924-49 ft.

Cumberland, Marshall County: Pure Oil 2 Thompson 108, SW SW SE 21-5s-7, abandoned location.

Cushing, Payne County, west outpost: Oklahoma Gaso. Plants 2 Loretta, NW SW NW 2-18-6, flowed 90 bbl., sand 3,259-68 ft., T.D. 3,342 ft.

Hotulke, Pottawatomie County: R. Olsen 1 Harrington, SW NW 24-9-4, flowed 628 bbl., Hunton 4,234-60 ft.

Atlantic 1 Krauch, NW SW NW 27-9-4, pumped 276 bbl., Viola 4,430-60 ft., T.D. 4,671 ft.

West Hotulke, Pottawatomie County: Ohio Oil 1-A Meyer, NW NE NW 21-9-4, pumped 712 bbl., Viola 4,550-66 ft., T.D. 4,817 ft.

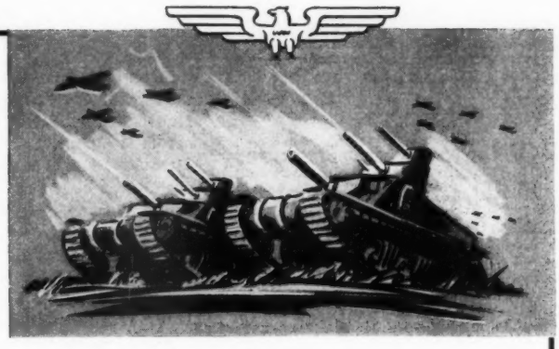
St. Louis, Pottawatomie County: J. F. Smith 1-A Ross, SW NW SW 32-8-4, flowed 481 bbl., Hunton 3,902-36 ft.

Miscellaneous

Creek County: Tibbens Oil 1 McGrath, NE NW 19-14-9, dry, T.D. 2,852 ft.

Deep Rock 1 Watts, SE SE NW 16-15-7, flowed 152 bbl., second Wilcox 3,930-56 ft., T.D. 3,975 ft.

Tulsa County: Abe Peppis 2-A Oswald, SE SE NW 6-17-13, dry, T.D. 2,025 ft.



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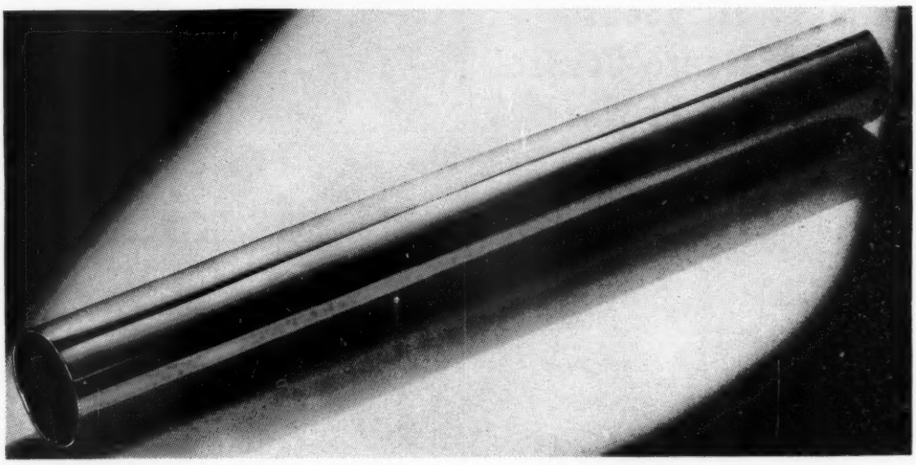

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INDIANA, OHIO, KENTUCKY

Offset to Mauzy Discovery Finds Thin Section of Pay

EVANSVILLE, Ind. — Gulf Refining Co. has set casing to Aux Vases sand at 1 Frank Schutte, NE NW 8-7s-12w, offset to Paul Rossi's pool-opening well, 1 Mauzy, east of Mount Vernon in Posey County.

The Aux Vases section was so thin at 1 Schutte the operators at first believed they had missed the sand. However, the test was drilled on to 2,832 ft. and after an electric log operators decided to set at 2,602 ft Saturation is at 2,607-11 ft.

Sun Oil Co. 1 L. C. Byrd, a wildcat in the southern part of Posey County, NE SE 4-8-14w, is waiting on cement after a squeeze job to shut out water which flowed following a 3,000-gal. acid treatment in the McClosky at 2,649-53 ft. Aux Vases saturation at 2,602-21 ft. has not tested.

Meanwhile, in the same county, Carter Oil Co. has abandoned its 1 Mabel Baker, SE NE 8-7s-14w, offset to 1 James Baker, a McClosky discovery. No. 1 Mabel Baker tested a show of oil in the Pennsylvanian sand at 1,040-55 ft. but only fresh water was recovered. The well was drilled to a total depth of 2,949 ft. in the McClosky and plugged back.

New Trenton Lime Area

About 10 miles east of Portland, near the Ohio-Indiana line, E. G. Henderson 1 Kaffenbacher was recently completed for 20 bbl. a day from Trenton lime at 1,131 ft. The oil tests 41 gravity and location is some 8 miles west of nearest production. Shallow Trenton lime in this area has been productive for many years.

OHIO

ZANESVILLE, Ohio.—Ohio completions were confined for the most part to the shallow southeastern fields. Monroe County yields two fair oil wells.

Twenty-four new tests were started during the week, 18 of which are heading for the Clinton horizon.

OHIO COMPLETIONS

Ashland County, Lake Township: Glen Harmon 9 Muskingum Conservancy Dist., Sec. 3, 140,000 cu. ft. gas, Clinton, shot, T.D. 2,832 ft.

Coshocton County, Clark Township: Mehowa O. & G. 1 Ruby Buron, Sec. 8, 100,000 cu. ft. gas, shot, Berea, T.D. 878 ft.

Granger Township: M. L. Packard et al, Lot 25, Remson tract, 40 bbl., Berea, T.D. 453 ft.

Meigs County, Orange Township: Ohio Fuel 2 H. E. Guthrie, Sec. 36, 939,000 cu. ft. gas, Berea, T.D. 1,618 ft.

Rutland Township: Ohio Fuel 1 I. B. Stevens, Fraction 34, 350,000 cu. ft. gas, Maxon, T.D. 783 ft.

Downie et al 2 Allen Ward, Sec. 32, 130,000 cu. ft. gas, Maxon 740-80 ft., Keener 783-97 ft., dry, T.D. 797 ft.

Morgan County, Marion Township: J. T. Bowman 1 fee, Sec. 16, 1,120,000 cu. ft. gas, Salt sand, T.D. 950 ft.

Monroe County, Franklin Township: Leonard Hines et al 4 Philip Stoffle, Sec. 1, 15 bbl., 1,000,000 cu. ft. gas, shot, sand 1,103-14 ft., T.D. 1,114 ft.

J. C. Lunurgh et al 1 George McConnell, Sec. 1, 35 bbl., 60,000 cu. ft. gas, sand 1,295-1,310 ft.

Muskingum County, Salt Creek Township: Ohio Fuel 1 J. H. Young, Sec. 8, 1,100,000 cu. ft. gas, Clinton 4,196-4,233 ft.

Perry County, Clayton Township: Preston Oil 1 Holbein & Embrey, Sec. 4, 21 bbl., shot, Clinton 3,272-3,324 ft., T.D. 3,337 ft.

Palm Oil Corp., Inc., 4 Davis & Dittoe, NW Sec. 16, 85 bbl. and 50,000 cu. ft. gas, Clinton sand, T.D. 3,340 ft.

Stark County, Pike Township: East Ohio 1 C. M. Welty, Sec. 28, dry, Clinton, T.D. 4,787 ft.

Washington County, Barlow Township: Chas. D. Fogle 4 fee, Sec. 13, 40,000 cu. ft. gas, shot, Berea, T.D. 1,901 ft.

Fearing Township: John Wagner et al 1 O. Smithberger, Lot 88, dry, M-500-ft. sand, T.D. 1,050 ft.

Independence Township: W. C. Patterson 1 D. Worstell, Sec. 18, 3 bbl., shot, Injun, T.D. 1495 ft.

EASTERN KENTUCKY

ASHLAND, Ky. — Gas production took an upward spurt in eastern Kentucky this week as the Kentucky-West Virginia Gas Co. drilled in four wells for a combined open flow production of 6,532,000 cu. ft. of gas daily.

Other drilling operations continued unchanged although a few locations have been made in some of the areas. Several wells are rapidly nearing the completion stage and may be drilled in by next week.

EASTERN KENTUCKY COMPLETIONS

Martin County: No. 5391 W. B. Preece, 4,308,000 cu. ft. of gas at 1,231 ft.

No. 5342 John Crider, 1,309,000 cu. ft. of gas, deepened to 1,428 ft.

Pike County: No. 645 Roland Spears, 158,000 cu. ft. gas at 2,861 ft.

No. 682 Allen Cline, Big lime, open flow, 747,000 cu. ft. gas at 1,000 ft.

WESTERN KENTUCKY

In Henderson County, Chenault and Paul Farmer 1 Glenmore Distillery, SW NE SW 19-Q-26, a wildcat ½ mile west of the town of Reed, pumped 34 bbl. of oil with no water from the McClosky at 2,003-09 ft. and 2,019-30 ft. after a second acid treatment. A previous test after the first acid treatment of 1,000 gal. pumped 42 bbl. of oil and some water. Nearest production is the same company's 1 Chase, ¾ mile north, which is also producing from the McClosky. South of the 1 Glenmore Distillery, Snowden McSweeney 1 fee, SE SE SW 19-Q-26, is drilling below surface casing.

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MICHIGAN

Major Field in Missaukee County Is Possibility

By OTTO C. PRESSPRICH

SAGINAW, Mich.—Northern Michigan appeared headed for a new oil boom this week as the result of Turner Petroleum Corp. success in drilling 1 Cavanagh in Section 14 of Riverside Township, Missaukee County. Some operators believe the test, which has been flowing naturally up to 450 bbl. a day may be the opener of a major new field.

In established fields last week, best showings were made in Osceola and Clare counties, Pure Oil Co. completing a Reed City field well rated at better than 5,000 bbl. a day potential while Ohio Oil Co. reported one which flowed by heads up to 762 bbl. a day in Franklin Township, Clare County, Pure 2 Bonninghausen was rated at 1,032 bbl. a day.

Meanwhile Taggart Brothers Co. completed its fifth gas well in the Evart field, Osceola Township, Osceola County, the 5 Arndt-Rohrer gaging 3,000,000 cu. ft. a day.

On May 7 and 8, the state Conservation Department will offer at auction oil and gas lease rights on 43,000 acres of state-owned land. Big blocks will be available in Missaukee and Lake counties, about 3,750 acres are available in Isabella County.

Michigan May production quotas have been set at 60,500 bbl. a day, a 300-bbl. increase over the April limit set by the OPC.

The Conservation Department issued 18 drilling permits last week, increasing the 1942 total to 165. Five permits are for tests in Osceola County, three for Roscommon, three for Clare, two for Allegan, two for Missaukee, one for Bay, one for Lake and one for Ottawa County.

MICHIGAN COMPLETIONS

Allegan County, Lee Township: Clapsaddle & Harris 1 Siplora, NW NW SE 35-1n-15w, wildcat, dry, T.D. 1,200 ft.

Barry County, Johnstown Township: Homer Fulton 1 Case, NW SW NE 9-1n-8w, wildcat, dry, T.D. 1,882 ft.

Clare County, Franklin Township: Pure Oil Co. 2 Bonninghausen, E½ NE Frl. ¼ 4-20n-3w, initial daily potential 1,032 bbl., naturally, T.D. 3,353 ft.

Winterfield Township: Leonard Drilling Co. 1 Mills, C S½ NE NE 2-20n-6w, wildcat, dry, T.D. 3,777 ft.

Bay County, Monitor Township: The following locations abandoned: L. C. MacGregor 1 Schultz, SW NE NW 2-14n-4e; 3 Staudacher, SE NW NW Sec. 2; 4 Staudacher, SW SW NW Sec. 2; 5 Staudacher, SE SW NW Sec. 2; 6 Staudacher, NE NW SW Sec. 2, and 2 Swantek, NW NW NE Sec. 2.

Montcalm County, Ferris Township: R. A. Wells 1 Connor communitized, NW NE SW 26-11n-5w, location abandoned.

Osceola County, Lincoln Township: Ohio Oil Co. 1 Hoogerhyde, C S½ SW NE 20-18n-10w, 762 bbl., flowing by heads, T.D. 3,563 ft.

Ohio Oil Co. 4 Riggs, S½ SW NE Sec. 19, 2,160 bbl., T.D. 3,601 ft.

Pure Oil Co. B-2 Richards, C S½ SE NW Sec. 19, 5,320 bbl., T.D. 3,608 ft.

Osceola Township: Taggart Bros. Co. 5 Arndt-Rohrer et al, C NW 26-18n-8w, 3,000,000 cu. ft. gas, T.D. 1,382 ft.

New Rulings to Stimulate Production Are Expected

MATTOON, Ill.—Wildcat activity and operations in proven fields in Illinois should be greatly stimulated as the result of a promise that the Government will consider granting Illinois operators exceptions to the federal regulatory drilling order, M-68. Last week at Mount Vernon, officials of the state Division of Oil and Gas Conservation told a meeting of nearly 200 operators that they will be permitted to drill sand wells spaced 20 acres apart, providing this is necessary to the best development of the field, and the wells be not deeper than 2,500 ft. Operators were also told that it may be possible to drill a lime well and a sand well to every 40 acres.

The appeals for exceptions were made verbally in Washington on April 14 and 15 but announcement of official reaction in the Office of the Petroleum Coordinator was withheld until the Mount Vernon meeting.

Clinton Wildcat May Open Major Field

A Clinton County wildcat, the basin's most interesting test, was near completion last week. E. Frank Jones 1 Harrison, NE SE NW 2-2n-2w, near the village of Huey, swabbed 155 bbl. in 9 hours from the Benoist and may have opened a major field. Next week Texas Co. is expected to begin drilling its 2 Price Gray, ½ mile northwest of the 1 Harrison.

Texas 1 Price Gray, S½ NW SE 35-3n-2w, drilled last year, had a show of oil in the Benoist but was drilled deeper and completed in the Devonian lime as a gas well without testing the sand horizon. No. 1 Gray has never been produced.

A Franklin County wildcat, Sun Oil Co. 1 Old Ben Coal Co., NW NE NW 25-5s-1e, is shut down on orders at 2,880 ft. in the McClosky. No. 1 Old Ben Coal encountered saturation in the Aux Vases which yielded 40 ft. of oil and 40 ft. of oil-cut mud on a 1-hour drill-stem test. The test is about 8½ miles northwest of the Benton pool.

Hamilton County Wildcats

Three Hamilton County wildcats were being watched with considerable interest last week. These included the Seaboard Oil Co. 1 X. Kiefer, S½ SE SW 30-3s-5e, 2½ miles west of the Dale field, drilling below 2,575 ft.; H. Fotiades 1 Mangis, SW NW SE 27-5s-5e, 7 miles west of the Hoodville field, drilling near 2,700 ft., and Spitznagle 1 Jacob Keith heirs, NW NW SE 25-4s-7e, drilling below 2,700 ft.

Perry County Has Second Oil Producer

Perry County's second oil producer was completed last week for 12 bbl. of oil and 16 bbl. of water daily from the Cypress sand. The well was the Magnolia 1 Majewski, SW NE 22-4s-1w, in the Tamaroa pool opened recently by the Harsh 1 Newborn, SE SE NW 22-4s-1w.

W. R. White's 1 Albert Hershey, SE SW SE 27-2n-12w, a wildcat just north of the Wabash County line, is showing for a 50 to 75-bbl. well in the Benoist sand at 2,016-18 ft. No. 1 Hershey is in the area between the South Lawrence and Allendale fields.

ILLINOIS COMPLETIONS

Wildcats

Bond County: Republic 1 Mitchell, SW SE SE 28-6n-3w, location abandoned.

Clay County: John Sanders et al 1 Bissey, S½ NE NW 2-2n-7e, dry at 3,140 ft., Menard 2,275 ft., Glen Dean 2,522 ft., Golconda 2,597 ft., Barlow 2,676 ft., Benoist 2,902 ft., Renault 2,931 ft., Ste. Genevieve 3,029 ft., McClosky 3,088 ft.

Crawford County: T. H. Hicks 1 Catrell Comm., NW SE 23-5n-14w, dry at 2,853 ft., Glen Dean 2,271 ft., Golconda 2,344 ft., Barlow 2,429 ft., Benoist 2,654 ft., Renault 2,696 ft., Ste. Genevieve 2,748 ft., McClosky 2,779 ft.

Gallatin County: Jarvis Bros. 1 Drone, NW NW NW 8-9s-10e, dry at 2,903 ft., Kincaid 2,076 ft., Menard 2,244 ft., Waltersburg 2,383 ft., Vienna 2,437 ft., Renault 2,666 ft., Aux Vases 2,725 ft., Ste. Genevieve 2,761 ft., McClosky 2,806 ft.

Jefferson County: Dick Schwab et al 1 Hutching-Holderman, NE SE NW 36-1s-1e, dry at 2,426 ft., Menard 1,488 ft., Tar Springs sand 1,597 ft., Glen Dean 1,712 ft., Hardinsburg 1,744 ft., Golconda 1,799 ft., Barlow 1,910 ft., Cypress sand 1,930 ft., Benoist 2,085 ft., Renault 2,141 ft., Ste. Genevieve 2,257 ft., Fredonia 2,345 ft., McClosky 2,347 ft., St. Louis 2,416 ft.

Marion County: W. O. Morgan et al 1 Doolen, NE SE 5-4n-1e, dry at 1,603 ft., Glen Dean 1,255 ft., Golconda 1,319 ft., Barlow 1,397 ft., Benoist 1,590 ft.

Randolph County: C. N. Kraft 1 McCrary, NE SE SE 2-4s-5w, dry at 1,205 ft., Glen Dean 810 ft., Benoist 1,081 ft., Aux Vases 1,176 ft.

Wayne County: New Penn. Dev. 1 W. Fisher, W½ NW NW 27-2s-9e, dry at 3,398 ft., Glen Dean 2,720 ft., Barlow 2,933 ft., Aux Vases 3,248 ft., Ste. Genevieve 3,285 ft.

New Penn. Dev. 1 C. Harris, W½ SE NE 28-2s-9e. dry at 3,436 ft., Glen Dean 2,692 ft., Barlow 2,896 ft., Renault 3,198 ft., Aux Vases sand 3,209 ft., Ste. Genevieve 3,265 ft., Fredonia 3,330 ft., McClosky 3,391 ft.

Washington County: Shell 1 Mill, SE SW SW 31-2s-1w, dry at 1,769 ft., Glen Dean 1,096 ft., Golconda 1,161 ft., Barlow 1,253 ft., Cypress sand 1,298 ft., Benoist 1,455 ft., Renault 1,501 ft., Aux Vases 1,516 ft., Ste. Genevieve 1,624 ft., Fredonia 1,657 ft., St. Louis 1,765 ft.

White County: Aetna et al 1 J. W. Burris, SW NE SE 7-7s-10e, dry at 3,115 ft., Kincaid 1,790 ft., Degonia 1,936 ft., Clore 1,990 ft., Palestine 2,065 ft., Menard 2,160 ft., Waltersburg 2,233 ft., Vienna 2,288 ft., Tar Springs sand 2,313 ft., Glen Dean 2,400 ft., Hardinsburg 2,435 ft., Golconda 2,478 ft., Barlow 2,596 ft., Cypress sand 2,620 ft., Paint Creek 2,695 ft., Benoist 2,716 ft., Renault 2,813 ft. Aux Vases sand 2,912 ft., Ste. Genevieve 2,923 ft., McClosky 2,966 ft., St. Louis 3,105 ft.

Fields

Bible Grove, Clay County: Texas Co. 1 Landwehr, NW SW NE 8-5n-7e, pumped 195 bbl., 10-qt. shot 2,498-2,508 ft., Cypress 2,467 ft., T.D. 2,924 ft., P.B. 2,510 ft.

Bone Gap, Edwards County: Tide Water 3 Gawthrop, N½ SW SE NW 18-1s-11e, flowed 505 bbl., natural, perf. 3,198-3,204 ft., McClosky 3,199-3,208 ft., T.D. 3,208 ft.

Coil, Wayne County: First Nat. Pet. Trust 1 Ellis Comm., NW SE 18-1s-5e, pumped 69 bbl., 40-qt. shot 2,960-80 ft., Aux Vases sand 2,960 ft., T.D. 2,980 ft.

Dale, Hamilton County: Texas 1-B J. C. Hall, NW NW NW 17-6s-7e, flowed 684 bbl., natural, Aux Vases 3,005-12 ft., 3,019-25 ft., T.D. 3,032 ft.

New Harmony, White County: Sun 1 C. Hon, SW SE 32-4s-14w, pumped 22 bbl. oil and 10 bbl. water, McClosky 2,922-27 ft., 2,944-53 ft., 2,970-79 ft., T.D. 2,981 ft.

Parkersburg, Edwards County: Magnolia 1 K. O. Koertge, N½ NE NE 6-1n-14w, pumped 224 bbl. oil and 2 bbl. water, perf. 3,124-27 ft., 1,000 gal. acid, McClosky 3,125-36 ft., T.D. 3,200 ft., P.B. 3,168 ft.

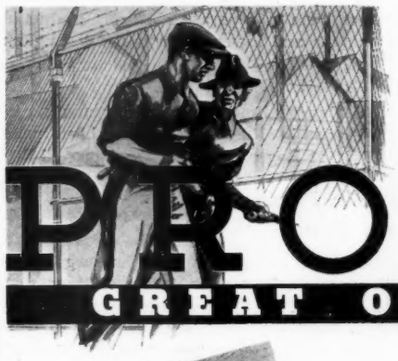
Roland, White County: N. V. Duncan 1 M. Powell, NW NW SE 1-7s-8e, dry, Levias 2,934 ft., Fredonia 3,003 ft., old well deepened to 3,121 ft.

Rural Hill, Hamilton County: Ring 2 Craddock, SE SE NW 22-6s-5e, dry at 3,220 ft., Aux Vases sand 3,190 ft.

Ste. Marie, Jasper County: Lain O. & G. 3 Burton, SW SW 5-5n-14w, pumped 200 bbl., 4,000 gal. acid, McClosky 2,832-38 ft., T.D. 2,882 ft.

Harvey Simms 1 Ederer, E½ SE SW 6-5n-14w, location abandoned.

Tamaroa, Perry County: Magnolia 1 Majewski, SW NE 22-4s-1w, pumped 12 bbl. oil and 17 bbl. water, 15-qt. shot 1,128-34 ft., Cypress sand 1,114 ft., T.D. 1,137 ft.



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NORTH CENTRAL TEXAS

Production Found in Another Sector of Rogers & Rogers

By ROBERT INGRAM

WICHITA FALLS, Tex.—Three wildcats being drilled in Montague County by Sinclair Prairie Oil Co. were completed last week, one of them a discovery, the other two dry holes (see completions). The discovery, Sinclair Prairie 1 Jesse Sanders, Block 114, Belcher subdivision, J. C. Mattison Survey, extended production in the Clingingsmith pool (Nocona lime) 1¼ miles to the northwest.

The Sanders well, which was given a potential of 3,002 bbl. flowing, was one of a number of wildcats in the vicinity of the Rogers & Rogers Nocona field and many oil men consider the entire area part of the Rogers & Rogers field. Thus, the well would be another of a series of major extensions to that field rather than an extension of the Clingingsmith area which in itself is generally considered part of Rogers & Rogers.

The area, which lies west of Nocona townsite, has been under exploration since October 1923. In August 1939, L. S. Youngblood and R. L. Foree 1 Davis opened production from the upper Strawn series; in December of the same year, Stanolind 2 Davis discovered Caddo production at a total depth of 5,249 ft.; Sinclair Prairie 1 Lena Benton opened the East Nocona Townsite extension in June 1940, and the Clingingsmith area to the southwest was opened in June 1941, by Sinclair Prairie 1 Clingingsmith.

The field lies on an anticline plunging off a regional flattening on the east flank of the Fort Worth syncline and overlies a "peak" in basement rocks. East Nocona is believed to represent production from a separate closure. Production is from upper and lower Strawn, Bend conglomerate, and Nocona lime (also called Bend or Marble Falls lime).

The Ellenburger lime, in the past year a major deep objective in North Texas, has been penetrated 97 ft. at Rogers & Rogers and proved dry.

Ordovician Discovery In Jack County

A good producer to open an Ellenburger lime field in north Jack County was proved when a gage of 160 bbl. in 3 hours was turned in for Taubert & McKee 1 Boyd, Seth Hazel Survey, 3 miles south of Post Oak. The flow was through ½-in. choke at the rate of 72 bbl. the first hour, 48 bbl. the second, and 40 bbl. the third. Ending pressures were 450 lb. on casing and 250 lb. on tubing.

Bottomed at 6,435 ft., the well had been treated with 1,000 gal. of acid and had been shut in for several days. The well was shut in for lack of storage. It first showed as a pool opener 3 weeks ago, but testing was delayed by heavy rain in the area.

Simpson Pay Found in Basin

Another new field was showing in Montague County, 4 miles east of Bowie on the north edge of the Fort Worth basin. It was at Continental Oil Co. 1 Mueller, P. Hamilton Survey. The showing came from a section identified variously as the Simpson, Middle Ordovician, and also the Ellenburger, Lower Ordovician, which was topped at 7,135 ft.

The well drilled sand showing oil from that depth to 7,140 ft. and cored from 7,140-44½ ft. with recovery of 3 ft. of sand showing oil and 1 ft. of dolomitic lime. Testing and coring continued until the well drilled soft sand at 7,218-23 ft., total depth. When operators started to make a drill-stem test, pressure began forcing fluid from the hole.

To keep it under control, operators pumped in heavy mud, then were preparing to run 5½-in. liner to the top of the sand for a test.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Archer County: Bridwell Oil 2 H. Conrady, 1,360 ft. from W line and 495 ft. from S line, Lot 23, Blk. 4, C.&P. Sur., 2½ mi. SW of Windthorst, dry, T.D. 2,007 ft.

Grayson County: Sinclair Prairie 1 Wheeler, 660 ft. from N and W lines of Wheeler tract in C. Quillen Sur., A-989, 1½ mi. SW of Collinsville, dry, T.D. 4,513 ft.

Montague County: Rogers Brothers Drilling 1 J. M. Agee, 150 ft. from S and E lines of J. Woodruff Sur., A-867, 4 mi. NE of Bonita, pumped 65 bbl., sand 2,824-43 ft., 5½-in. 2,822 ft., T.D. 3,064 ft., P.B. 2,843 ft., *discovery*.

Sinclair Prairie 1 M. E. Collier, 740 ft. from SW line and 460 ft. from SE line of J. Collier Sur., A-1212, 6 mi. E of Montague, dry, Caddo 6,450 ft. conglomerate 6,715 ft., Viola 7,415 ft., T.D. 8,000 ft.

Sinclair Prairie 1 J. W. McCall, 330 ft. from S and E lines of NE 40 acres of Sec. 1-50, J. H. Belcher subd., J. Olibarri Sur., 3¾ mi. SW of Nocona, dry, Caddo 5,934 ft., T.D. 6,250 ft.

Sinclair Prairie 1 Jess Sanders, 660 ft. from S and W lines of Blk. 114, J. H. Belcher subd., 1½ mi. NW of Clingingsmith pool, flowed 375.3 bbl. in 3 hr. through tubing, potential 3,002 bbl., gravity 36.8, pay in conglomerate 5,962-72 ft., top Caddo 5,792 ft., T.D. 5,972 ft., *discovery*.

Fields

Consolidated, Wilbarger County: Consolidated Oil 7 W. T. Waggoner, 990 ft. from E line and 1,050 ft. from S line Sec. 36, Blk. 6, H.&T.C. Sur., dry, T.D. 4,083 ft.

K.M.A. Ellenburger, Wichita County: Chapman & McFarlin 5-E Mrs. Anna Mangold, 330 ft. from N line and 430 ft. from W line Lot 36, P. Castleman Sur., A-35, potential 1,056 bbl. flowing, Ellenburger pay 4,268-4,343 ft., acid, T.D. 4,383 ft.

K.M.A., Wichita County: Consolidated Oil 2 A. D. Potts-D, 1,908 ft. from S and E lines of Sec. 4, Blk. 7, H.&T.C. Sur., pumped 70 bbl., dolomite 4,050-65 ft., acid, T.D. 4,589 ft., P.B. 4,065 ft.

Thornberry, Clay County: Texas 1 Dallas J. S. L. Bank, 3,200 ft. from SE line and 660 ft. from NE line of 440-acre tract in J. Duncan Sur., A-112, dry, T.D. 1,752 ft.

Miscellaneous

Archer County: Coyle & Stine 2 J. R. Garvey, 2,000 ft. from N line and 330 ft. from E line Sec. 1855, T.E.&L. Sur., pumped 65 bbl. after acid, pay 754-68 ft., T.D. 768 ft.

Young County: Noble Gray 2 A. L. Porter, 2,400 ft. from S line and 750 ft. from N line of W. Cantwell Sur., A-1393, dry, T.D. 642 ft.

R. J. Watson 1 T. J. Routon, 330 ft. from N and E lines of SE Sec. 265, T.E.&L. Sur., dry, T.D. 750 ft.

New Well Is Largest In Novice Field

States Oil Corp. 1 Frank Hudson, 1,980 ft. from the south line and 467 ft. from the west line of Section 22, Block 2, T.&N.O. Survey, in the Novice field, Coleman County, was completed flowing 232 bbl. of oil natural in 6 hours through ¾-in. tubing choke, last week. The rate of flow gave the well a potential of 928 bbl., the largest in the field to date.

Gray sand pay was obtained from 3,474-3,522 ft. in deepening from 3,437 ft. where gas gaged 10,100,000 cu. ft. daily in February 1941. The well was bottomed at 3,540 ft. and cemented 5½-in. casing. On its first gage after plugs were drilled it flowed 60 bbl. of oil an hour for 3 hours.

Coke County Well to Test

Plugs were to be drilled at week's end from William F. Morgan 1 J. S. Craft, 660 ft. out of the NE cor. Section 276, Block 1-A, H.&T.C. Survey, a wildcat 3 miles southwest of Blackwell. Five and one-half inch casing was set at 3,817 ft. with 30 sacks of cement for a test of 4½ ft. of porous, saturated lime which was in about the middle of a 7-ft. section recovered from a core at 3,817-28 ft. The well is a diagonal southwest offset to Mid-Kansas 1 W. E. Lackey, which, in April 1929, filled 2,300 ft. with 40-gravity oil from 3,755-56 ft. but failed to produce.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Jones County: Lewis Production Co. 1 W. A. Minter, Lot 15, Robert Smith Sur. 192, dry, T.D. 2,357 ft.

(Continued on Page 98)

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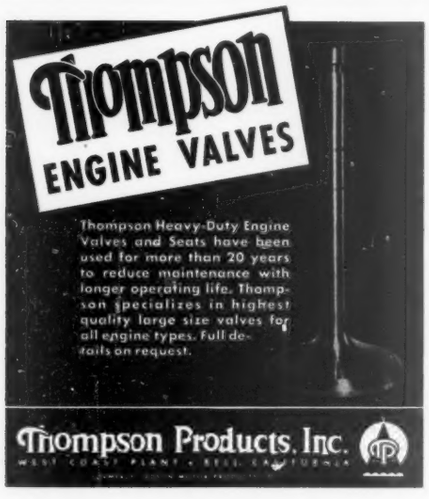
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CANADIAN FIELDS

North Turner Valley Well Has Lowest Gas-Oil Ratio

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural-gasoline production from all Alberta fields for the week ending April 20 averaged 27,596 bbl. daily, compared with 28,358 bbl. daily for the previous week and 27,478 bbl. daily for the corresponding week last year. The daily average included 26,360 bbl. of crude and 960 bbl. of natural gasoline from Turner Valley, and 276 bbl. of crude from outside fields. There were 210 producing wells, with 45 drilling, 1 finished, 3 testing, 2 suspended, 2 standing, 1 abandoned, 3 spudded, and 1 new drilling license issued.

Atlas Producer

In North Turner Valley, Atlas-British Dominion 2, LSD 4, 17-21-3w5, most northerly producer in the field, is operating with the lowest gas-oil ratio, averaging around 586 cu. ft. Daily average production is close to the April allotment of 752 bbl. As this was based on a gas-oil ratio of 727 cu. ft., an increase in allowable is likely. The well is producing under strong back pressure, around 1,000 lb. on the casing, 150 to 200 lb. on tubing and separator.

Tilley Field

The Tilley area in southeastern Alberta seems likely to develop a proven field. Northwest Co. 2, LSD 4, 17-17-21w4, finished around 3,185 ft., maintained a steady production of 50 to 60 bbl. of 22-gravity crude over a period of 7 weeks, shutting down when all available storage was filled. A 2-mile pipe line has been laid to the nearest railway and shipments are starting. Northwest 1, LSD 1, 7-17-12w4, finished in the lime at 3,208 ft., is a gasser. Northwest 4, LSD 5, 17-17-12w4, is finishing below 3,051 ft., and Northwest 3, LSD 13, 17-16-12w4, is below 604 ft.

May Drill National Park

Applications have been made to the Dominion Government for drilling rights on Wainwright National Park, in East Central Alberta. The park, formerly a buffalo preserve, has been taken over by the national-defense department for mechanized training purposes. It is believed that the Wainwright shallow field extends a considerable distance into the park area. In the field itself, Wainwright Development 1, LSD 8, 17-45-6w4, is spudding.

Aid for Monitor Drilling

The Dominion Government has agreed to assist the McColl-Frontenac Oil Co. in exploratory drilling in the Oyen-Sounding Creek area near Monitor in eastern Alberta. Assistance will be by way of special credits on income and excess profits tax, based on the cost of drilling nonproductive wells. The agreement specifies that the company has already spent $90,000 in survey in the area, which gives reasonable prospect of yielding producing wells. McColl-Frontenac 1, LSD 4, 5-32-4w4, finished a dry hole at 3,803 ft. and McColl-Frontenac 2, LSD 16, 17-29-5w4, is in lime below 3,626 ft. The agreement obligates the company to drill at least two wells, but an actual program of 10 wells at a cost of $800,000 has been outlined. It is proposed to drill one test to 6,000 ft. and others to 4,200 ft.

Taber Field

In the Taber field, Border Petroleums 1, LSD 5, 32-19-17w4, finished around 3,840 ft., has been abandoned. It got good oil shows with considerable gas, but ran into water troubles. Standard of British Columbia is planning to drill close to the highway, 3 miles from Taber, and will spud this spring, with E. D. Williamson in charge for the Can-Tex Drilling Co. Majestic-Plains Petroleum 2 is maintaining a fair pumping production which is shipped to the North Star refinery at Winnipeg.

Vermilion Field

Interests of the Acme Gas & Oil Co. of Toronto in the Vermilion-Battleview field are being taken over by Borrodaile Oils, Ltd., a newly organized company in which Acme will hold a one-third stock interest. Production is taken by the Vermilion Consolidated refinery at Borrodaile, which is making daily shipments of fuel oil to the railways.

EASTERN TEXAS

Smackover Lime Play Of Major Importance

By ROBERT INGRAM

DALLAS, Tex. — Smackover lime exploration along the entire northern end of the Balcones fault line was taking form as a major play by last week. The play began more than a year ago when one lease of 80,000 acres was acquired, and it was spurred by discovery late in 1941 of a Smackover lime pool near Patmos, Ark., north of the fault where chances for Smackover had previously been regarded as slight.

Currently the key test in the play is Texas Co. 1 Keeling, Whitaker Survey, 6 miles southwest of Coolidge in Limestone County. Information was being withheld on tops and showings, but the well was reported to have reached 4,725 ft. in sandy shale and sand. This was at the southern end of the play.

Also seeking the Smackover was American Liberty 1 McNatt, Murphy Survey, 5 miles west of Greenville in Hunt County. This well was going ahead at 3,252 ft. in broken lime. From elevation of 573 ft., the well topped the Georgetown at 2,717 ft. and the Woodbine at 1,995 ft.

Meantime, reports were heard in Dallas that the South Groesbeck gas area in Limestone County may get an 8,500-ft. Smackover lime test. Proposed location is on the Cannon Barron land in the northwestern part of the W. G. McKenzie Survey and it was reported that the Zephyr Oil Co. and other lease owners are to contribute 2,000 acres while H. H. Hernstedt estate owners will contribute cash. A Dallas oil man is expected to be the operator if the deal goes through. The field was opened to gas-distillate pay from the Pettit by Murray Samuel and Zephyr Oil Co. 1 Barron.

Two Discovery Offsets Drilling

Offsets to the most recent East Texas discoveries were drilling ahead last week. They were C. C. Gilger 1-A Grogan, Watson Survey, in Cass County, north of the John Messenger discovery, and Magnolia Petroleum Co. 1 Kelley, McNeely Survey, southwest of the Anderson County discovery (completed for 200 bbl. a day). The 1-A Grogan had reached 3,400 ft., and the 1 Kelley was below 1,045 ft.

EAST TEXAS COMPLETIONS

Wildcats

Robertson County: Kirby & Morrison 1 W. Martin, W. R. Cox Sur., ½ mi. E of Easterly, dry, Wilcox 275 ft., Midway 1,748 ft., T.D. 2,620 ft.

Fields

Concord, Anderson County: Magnolia 1 W. C. Campbell, J. B. McNelly Sur., pumped 201 bbl. through 2½-in. tubing, T.D. 4,669 ft., P.B. 4,550 ft.

Hawkins, Wood County: Humble 7 M. A. Kay estate, flowed 131 bbl. through ¼-in. choke in 6 hr., T.D. 4,703 ft.

Humble 4 N. M. Shamburger, J. Pollock Sur., flowed 124 bbl. in 6 hr. through ¼-in. choke, perf. 4,792-98 ft. and 4,859-64 ft., T.D. 4,880 ft.

Humble 2 S. H. Moore, flowed 104 bbl. in 6 hr. through ¼-in. choke, perf. 4,686-97 ft. and 4,715-21 ft. T.D. 4,780 ft.

Crude Price Changes

Barnsdall Oil Co. posted price schedule for Midway field, Arkansas, crude, effective May 1, ranging from 78 cents per barrel for 25° to 25.9° gravity crude to $1.08 for 40° gravity and above.

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ROCKY MOUNTAIN AREA

Water Encroachment in Leo Sand Gives Trouble at Lance Creek

By T. R. INGRAM

DENVER, Colo.—Water encroachment in the Leo horizon on the flanks of the Lance Creek field is reported giving some trouble and engineers for the unit and the independents are working on the problem. Repressuring of the Leo horizon has been under way for about a year and is reported slowing down the encroachment. The trouble first showed up in edge wells outside the unit which were heavily pulled following completion and prior to the introduction of cooperative measures.

Peterson & Sorenson 1 Government, SW NW SE 18-35n-3w, an east offset to the discovery in the West Kevin pool, pumped 40 bbl. daily from the Madison lime at 2,496-2,503 ft. without being acidized, which indicates that it will be a large well. It is preparing to acidize.

The Joan Oil Co. 1 Howell, NW SE NE 32-56n-97w, an important semiwildcat south of the Garland field oil discovery well and southwest of the nearest producer, which has been idle at around 3,200 ft. since 1939, has resumed following financing by California interests and a rotary is being moved in. Location is on a lower contour than any well so far drilled and may mark an extension of the field.

MONTANA COMPLETIONS

Cut Bank field, Carbon County: A. B. Cobb 2 Jeffries-Stufft, NE SE NE 3-35n-6w, drv, T.D. 3,033 ft., 7-in. 2,987 ft., Sunburst at 2,951-57 ft., Cut Bank 2,979-3,020 ft., show oil with water, P.B. and shot in upper Cut Bank without results.

Par Oil Co. 2 Tribal-204, NE NW SE 13-32n-6w, T.D. 2,990 ft., 7-in. 2,954 ft., show of oil in Sunburst at 2,928-38 ft., Cut Bank 2,951-87 ft., main pay 2,979-85 ft., 100-qt. shot, swabbed 17 bbl. in 8 hr.

Kevin-Sunburst field, Toole County: J. H. Agen 20 Goeddertz, SE NW SW 23-35n-3w, dry, T.D. 1,717 ft., contact 1,711 ft.

Texas Gulf Coast

(Continued from Page 88)

685 bbl., ¼-in. choke, sand 8,427-8,513 ft., T.D. 8,570 ft.

Ganado, Jackson County: Humble 4 Branch, 189 bbl., fluid 35 per cent salt water, 65 per cent oil, ¼-in. choke, sand 6,630-35 ft.

North La Ward, Jackson County: Glenora Oil Co. 2 Olsvosky, 185 bbl., 5/32-in. choke, perf. casing 5,208-24 ft., T.D. 5,227 ft.

Hewitt & Daugherty 2 Lawrence, 110 bbl. oil plus 15 per cent b.s. and w., perf. casing 5,221-25 ft., T.D. 5,225 ft.

Magnolia 15 Gordon, 35 bbl., 9/64-in. choke, perf. casing 5,627-28 ft., T.D. 7,735 ft.

Magnolia 19 Gordon, 48,000,000 cu. ft. gas open flow, perf. casing 5,207-17 ft., T.D. 5,225 ft.

Seabreeze, Chambers County: Sun 6 Acom, 817 bbl., ¼-in. choke, perf. casing 8,450-77 ft., T.D. 8,489 ft.

Withers, Wharton County: F. W. Michaux 33-A Pierce, 125 bbl., 5/32-in. choke, perf. casing 5,304-09 ft., T.D. 5,360 ft.

Old Ocean, Brazoria County: Harrison & Abercrombie 11 Armstrong, 480 bbl., ¼-in. choke, perf. casing 11,018 ft., T.D. 11,080 ft.

Wildcats

Harris County: Atlantic 1 Cohn, dry, T.D. 9,505 ft.

California Fields

(Continued from Page 84)

Miocene zone at West Coyote. To date Severns Drilling Co. has successfully completed six wells on the McNally lease at the extreme western end of West Coyote, all producing from the Miocene as the upper Pliocene zones do not extend far enough west to underly the McNally lease. Texas Co. is now testing the western end of the McNally property which aggregates about 2,400 acres.

LOS ANGELES BASIN COMPLETIONS

Wilmington, Los Angeles County: Long Beach Oil Development Co. 31-W Harbor, 10-5s-13w, pumped 120 bbl., 16.7-gravity, 2.6 per cent cut, T.D. 3,640 ft., gravel-packed perf. 2,796-3,017 ft., 3,292-3,406 ft., 3,447-3,572 ft., 3,590-3,635 ft., completed in the Ranger zone.

Long Beach Oil Development Co. 32-W Harbor, 9-5s-13w, pumped 120 bbl., 15.6-gravity, 3 per cent cut, T.D. 3,695 ft., gravel-packed perf. 2,973-3,219 ft., 3,494-3,607 ft., 3,647-90 ft., completed in the Ranger zone.

Royalty Service Corp. 4-A Nelson, 33-4s-13w, pumped 220 bbl., 15.2-gravity, 7 per cent cut, T.D. 3,470 ft., gravel-packed perf. 2,679-3,470 ft., recompleted in the Ranger zone.

Louisiana Gulf Coast Fields

(Continued from Page 91)

LOUISIANA GULF COAST DISTRICT

Fields

Cameron Parish: Magnolia 1 Cameron Meadows, 51 bbl., ⅛-in. choke, perf. casing 4,802-22 ft., T.D. 7,991 ft.

Horseshoe Bayou field, St. Mary Parish: Texas 6 St. Mary Parish Co., 4,000,000 cu. ft. gas, perf. casing 11,245-11,320 ft., T.D. 12,058 ft.

Lafitte, Jefferson Parish: Texas 72-A Madison Realty Co., 334 bbl., 5/32-in. choke, perf. casing 10,020-50 ft., T.D. 10,204 ft.

Unknown Pass, Orleans Parish: W. T. Burton 1 State, dry, T.D. 5,488 ft.

Vinton, Calcasieu Parish: Union Oil Co. of Calif. 1-G Gray, dry, T.D. 5,248 ft.

Union Sulphur 2 Gray, dry, T.D. 3,979 ft.

West Central Texas Fields

(Continued from Page 96)

Palo Pinto County: W. K. Gordon et al 2 Mrs. J. W. Conway, D. Mitchell Sur., A-1647, dry, T.D. 3,437 ft.

Shackelford County: R. H. Roark et al 1 J. H. Elliott-C, Sec. 9, L.A.L. Sur., 5,200,000 cu. ft. gas, sand 2,796 ft., T.D. 2,821 ft., *extension.*

Fields

Cisco, Eastland County: Hickok Production & Development 5 Wright & Harrell, J. B. Hoxie Sur., 6,000,000 cu. ft. gas, sand 3,328-31 ft. and 3,334-40 ft., T.D. 3,340 ft.

Nail, Shackelford County: Hickok & Reynolds 19 J. H. Nail-A, Sec. 133, E.T.R.R. Sur., pumped 81 bbl. natural, lime 1,525 ft., T.D. 1,531 ft.

Trent, Taylor County: Jennings & Griffin 1 L. S. Tinton, Sec. 20, Blk. 18, T.&P. Sur., dry, T.D. 3,065 ft.

Permian Basin, Panhandle

(Continued from Page 86)

Crockett County, started flowing while running casing at total depth of 2,000 ft. to make the second well in the northwest extension area of the Fort Lancaster area.

SOUTHERN WEST TEXAS COMPLETIONS

Wildcats

Pecos County: Gulf 1 W. T. Shearer, 660 ft. from SW line and 1,980 ft. from SE line Sec. 135, Blk. 10, H.&G.N. Sur., 8 mi. W of Girvin, elev. 2,406 ft., dry, Ellenburger 4,093 ft., T.D. 4,150 ft.

Magnolia 1 Loar-State, 330 ft. from NW and NE lines Sec. 2, Blk. 3, H.&T.C. Sur., approximately 1 mi. S of Abell production, elev. 2,393 ft., dry, detrital 4,945 ft., Simpson 4,995 ft., Waddell 5,854 ft., Ellenburger 6,282 ft., T.D. 6,483 ft.

Fields

Abell, Pecos County: Magnolia 2 Ericson-State, 648 ft. from S line and 672 ft. from E line Lot 4, Sec. 26, Blk. 9, H.&G.N. Sur., elev. 2,389 ft., pumped 49 bbl. oil and 38 bbl. water after acid, pay 3,930 ft., T.D. 3,963 ft.

Magnolia 2 Grove-State, 648 ft. from N line and 674 ft. from W line Lot 6, Sec. 26, Blk. 9, H.&G.N. Sur., elev. 2,388 ft., flowed 789 bbl. through ½-in. tubing choke natural, pay 5,840 ft., Waddell 5,407 ft., Ellenburger 5,810 ft., T.D. 5,884 ft.

George T. Ablee 1 Simmons est., elev. 2,373 ft., dry, anhydrite 400 ft., T.D. 2,410 ft.

Clara Couch, Crockett County: Humble 1 Couch, SE Sec. 37, Blk. GG, H.E.&W.T. Sur., ½ mi. SE of Fort Lancaster discovery, elev. 2,623 ft., pumped 52 bbl. after acid, pay 2,067 ft., T.D. 2,091 ft.

Dune, Crane County: Wasomes Oil 3-5 University, 330 ft. from W line and 1,650 ft. from S line NW Sec. 5, Blk. 30, University Sur., elev. 2,666 ft., flowed 138 bbl. through 1-in. tubing choke after shot, pay 3,184 ft., T.D. 3,384 ft.

Estes, Ward County: Gulf 169 Hutchins, 330 ft. from W line and 1,650 ft. from S line Sec. 10, Blk. O, G.M.M.B.&A. Sur., elev. 2,616 ft., flowed 442 bbl. after shot, pay 2,459 ft., T.D. 2,538 ft.

Goldsmith, Ector County: Clifford Mooers 1 J. D. Slater, 2,200 ft. from S line and 440 ft. from E line Sec. 12, Blk. 45, T-1-S, T.&P. Sur., ½ mi. W of south part of field, elev. 3,196 ft., flowed 50 bbl. oil and 83 bbl. water through tubing on gas lift, anhydrite 1,510 ft., Yates 2,790 ft., brown lime 3,825 ft., pay 4,240 ft., T.D. 4,266 ft., P.B. 4,254 ft.

Hoover, Crockett County: Atkins & Pittman 1 J. P. Scull, 330 ft. from S and E lines of Sec. 3, G.C. &S.F. Sur., ½ mi. N of production, elev. 2,368 ft., dry, T.D. 2,025 ft.

Rogers Harris 3 Hoover, 990 ft. from N and W lines Sec. 1, Blk. 1, G.C.&S.F. Sur., dry, T.D. 1,506 ft.

Johnson, Ector County: Continental 10-B Johnson, 1,650 ft. from N and W lines Sec. 5, W-2-S, Blk. 42, T.&P. Sur., elev. 2,972 ft., swabbed 292 bbl. after shot, pay 4,216 ft., T.D. 4,300 ft.

McElroy, Crane County: Gulf 19 McElroy, old well, old T.D. 2,927 ft., T.D. 2,998 ft., shot, pumped 320 bbl.

McMillan, Runnels County: Art Tucker 4-A King, 280 ft. from N line and 1,980 ft. from E line of Subd. 51, Domingo Diaz 532 Sur., dry, T.D. 2,293 ft.

North Cowden, Ector County: Texas 18 Holt, elev. 3,089 ft., flowed 523 bbl. after shot, pay 4,570 ft., T.D. 4,850 ft., P.B. 4,715 ft.

Sand Hills, Crane County: Magnolia 12 Lea, elev. 2,631 ft., flowed 363 bbl. through ½-in. tubing choke after acid, pay 4,364 ft., T.D. 4,700 ft.

White & Baker, Pecos County: Cardinal Oil 2-24-B University, 1,650 ft. from N line and 560 ft. from E line Sec. 24, Blk. 16, University Sur., elev. 3,022 ft., flowed 104 bbl. through tubing after shot, pay 2,100 ft., T.D. 2,120 ft.

TEXAS PANHANDLE COMPLETIONS

Carson County: Continental 3 Burnett-E, Sec. 117, Blk. 4, I.&G.N. Sur., dry, T.D. 3,357 ft.

Gray County: Coronado 5 Davidson-A, Sec. 87, Blk. B-2, H.&G.N. Sur., potential 110 bbl. oil and some water, pay 3,065-3,130 ft., T.D. 3,135 ft.

Phillips 11 Pan-Castleberry, Sec. 126, Blk. 3, I.& G.N. Sur., potential 303 bbl., pay 3,240-83 ft., T.D. 3,287 ft.

Phillips 5 Davidson, Sec. 86, Blk. B-2, H.&G.N. Sur., potential 212 bbl., pay 3,057-92 ft., T.D. 3,098 ft.

Hutchinson County: J. E. Crosbie 47 Pitts, Sec. 7, Blk. M-21, T.C.R.R. Sur., potential 326 bbl., pay 2,770-2,870 ft., T.D. 2,870 ft.

Dolomite Production 9 Perkins, J. McDaniels Sur., potential 175 bbl. oil, pay 2,970-3,071 ft., T.D. 3,071 ft.

Gooden & Parton 2 Hodges, Sec. 4, Blk. X-02, H.& O.B. Sur., pumped 20 bbl., pay 2,995-3,110 ft., T.D. 3,122 ft.

Midstates Petroleum 3 Whittenburg estate-A, Sec. 11, Blk. M-21, T.C.R.R. Sur., temporarily abandoned.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Completions the past week in New Mexico included one small oil well, one gas well and two dry. Although the first test finaled in Eddy County was dry, the outlook is considerably brighter this week with nine new locations reported.

SOUTHEAST NEW MEXICO COMPLETIONS

Cooper, Lea County: Kan-Mex Corp. 5-B Vaughn-3, SE NE NW 3-24-36, 10,000,000 cu. ft. sour gas through open casing, pay 3,220 ft., T.D. 3,590 ft., natural.

West Eunice, Lea County: Continental 1 State J-24, NW NE NW 24-21-34, dry, T.D. 3,930 ft., lime.

Maljamar, Lea County: Drlg. & Exploration 3-B Johns-24, NE SW 24-17-32, flowed 31 bbl. through choke, pay 4,150 ft., T.D. 4,345 ft., acid.

Red Lakes, Eddy County: A. H. Hover et al 2-B State, NW NW SE 30-17-28, dry, T.D. 553 ft.

Southwest Texas

(Continued from Page 90)

Hoffman, Duval County: Cruellar Brothers 2-B fee, 26 bbl., pumping, top sand 2,716 ft., T.D. 2,724 ft.

Margo, Starr County: T. E. Stephens 1 Ramirez, dry, T.D. 2,042 ft.

Sun, Starr County: Humble 10 Montalvo, 125 bbl., ½-in. choke, sand 4,612-24 ft., T.D. 4,624 ft.

Yzaguirre, Starr County: British American 1 Dick, dry, T.D. 5,510 ft.

Bastrop County: Stanley Thompson 1 Petty, dry, T.D. 3,600 ft.

Appalachian Fields

(Continued from Page 92)

Oriskany 5,092-5,155 ft., shot 5,092-5,132 ft., T.D. 5,187 ft.

Ripley district: United Carbon Co. 995 Elizabeth W. Perkins, 3,080,000 cu. ft. gas, Salt sand 1,575-1,804 ft., Maxton 1,804-64 ft., Big lime 1,962-2,020 ft., Injun 2,020-77 ft., Berea 2,493-2,505 ft., Corniferous 5,065-5,174 ft., Oriskany 5,174 ft., not shot, T.D. 5,210 ft.

Columbian Carbon Co. 1 Plusha Staats, 3,181,000 cu. ft. gas, Big lime 1,945-2,047 ft., Injun 2,049-2,159 ft., Berea 2,527-33 ft., Corniferous 5,042-5,145 ft., Oriskany 5,145-91 ft., gas 5,148-54 ft. and 5,164-68 ft., shot 5,145-85 ft., T.D. 5,222 ft.

Kanawha County, Poca district: Godfrey L. Cabot, Inc. 8 D. Holmes Morton, 4,500,000 cu. ft. gas, Corniferous 4,959 ft., Oriskany 5,049 ft., shot 5,055-75 ft., R.P. 1,655 lb., T.D. 5,128 ft.

NORTH LOUISIANA, ARKANSAS

Wildcat South of McKamie Finds Smackover Dry

SHREVEPORT, La.—Heavy rains and high water the past week have delayed or halted work in Arkansas this week. The overflow of Bodcaw Creek in Lafayette County has slowed operations in the Midway field, with many locations waiting to spud in.

Arkansas' deepest test, McAlester Fuel Oil Co. 1 Jeffus, a wildcat 6 miles south of the McKamie field, was dry at a total depth of 10,477 ft. A porous section of Smackover lime found at 10,345 ft. was encouraging but on drill-stem test salt water was recovered and it was decided to abandon the test.

ARKANSAS COMPLETIONS

Wildcats

Lafayette County: McAlester Fuel Co. 1 C. Jeffus, NE NW 4-19s-23w, dry, T.D. 10,477 ft., electrical tests: massive anhydrite 4,764 ft., base massive anhydrite 4,969 ft., top Travis Peak 6,068 ft., Cotton Valley 7,758 ft., Buckner 10,232 ft., Smackover lime 10,370 ft., porosity 10,435 ft.

Fields

Stephens, Columbia County: Haynes B. Ownby 1 E. C. Smart, NE NE 13-15s-20w, location abandoned.

Midway, Lafayette County: Barnsdall Oil Co. 1 F. C. Roberts heirs, NW SE 11-15s-24w, 325 bbl. oil at 6,475 ft.

Barnsdall Oil Co. 2 F. C. Roberts heirs, SW SE 11-15s-24w, 779 bbl. oil at 6,470 ft.

J. F. Breuil 1 Powell, SE NW 4-15s-24w, location abandoned.

Fouke, Miller County: Carter Oil Co. B-3 Sturgis, NE SE 2-17s-27w, 156 bbl. oil, 29.8° gravity, at 3,855 ft.

North Louisiana Again Active

Despite heavy rains that sent rivers over their banks and hindered road traffic, operators in North Louisiana are preparing for an early summer wildcat campaign. Activity in this area has been low throughout the winter.

The Haynesville field, producing from the Pettit lime at 5,300-5,400 ft., is the most active field, with nine new locations reported last week. Wildcat locations were reported for Caddo, Grant, and Tensas parishes.

Phillips Petroleum Co. is reported to be planning a 10,000-ft. test to the Smackover lime in the old Bellevue field. Location is NE SW 22-19-11w, on the southwest flank of the field.

NORTH LOUISIANA COMPLETIONS

Wildcats

Richland Parish: Bobby Manziel et al 1 Wooten, C NE 28-15n-5e, elev. 62 ft., dry, T.D. 4,005 ft., electrical tests: Wilcox 920 ft., Midway 2,145 ft., chalk 2,695 ft., base chalk 2,723 ft., Blossom sand 3,125 ft.

Fields

Caddo, Caddo Parish: Transport Oil Co. 2 Wilkinson, SW NE 22-20n-14w, dry at 976 ft.

Haynesville, Caliborne Parish: Blackwell Oil & Gas Co. et al 1 H. P. Camp, SW SE 10-23n-8w, 960 bbl. oil 40° gravity, T.D. 5,418 ft.

Blackwell Oil & Gas Co. et al 1 J. T. Waller, NE NW 23-23n-8w, 720 bbl. oil at 5,315 ft.

Midstates Oil Corp. 1 Church et al, NE NE 27-23n-8w, 660 bbl. oil at 5,521 ft.

Midstates Oil Corp. 1 Reeder, NE NW 26-23n-8w, 624 bbl. oil, 41.8° gravity at 5,472 ft.

Ohio Oil Co. 16 G. W. Taylor Acct. B-1, NE SE 15-23n-8w, 1,104 bbl. oil at 5,350 ft.

Olla, La Salle Parish: Fred Henslee 1 Sills, SE SW 23-10n-2e, dry at 2,338 ft.

Nebo, La Salle Parish: H. L. Hunt F-91 Nebo Oil Co. (was Goodpine), NW NE 28-7n-3e, 94 bbl. oil and 11 bbl. water at 4,151 ft.

Trout, La Salle Parish: H. L. Hunt F-100 Nebo Oil Co. (was Goodpine), SW NE 25-8n-2e, dry at 4,878 ft.

Little Creek, La Salle Parish: Placid Oil Co. 1 I. L. May, SW SW 30-9n-2e, 117 bbl. oil and 8 bbl. water at 2,690 ft.

MISSISSIPPI

JACKSON, Miss.—Carter Oil Co.'s wildcat, 1 Abernathy, SW SW 29-12s-5e, Chickasaw County, Mississippi, was reported testing the Fort Payne (Mississippian) lime formation at 3,106 ft. after plugging back from 3,494 ft. Shows of oil have been found in three horizons. Two new locations were reported and one failure. Placid Oil Co. 1 Batson, SE SE 15-4s-16w, Pearl River County wildcat, was dry at total depth of 6,134 ft.

MISSISSIPPI COMPLETIONS

Wildcats

Harrison County: Humble Oil & Ref. Co. 1 L. N. Dantzler Lbr. Co., 33-4s-11w, dry, T.D. 8,974 ft., top chalk est. 6,030 ft., Eutaw 7,175 ft.

Fields

Tinsley, Yazoo County: W. O. Allen and Hassie Hunt 1 A. J. Pickett, NW NW 32-11n-2e, dry, T.D. 5,987 ft.

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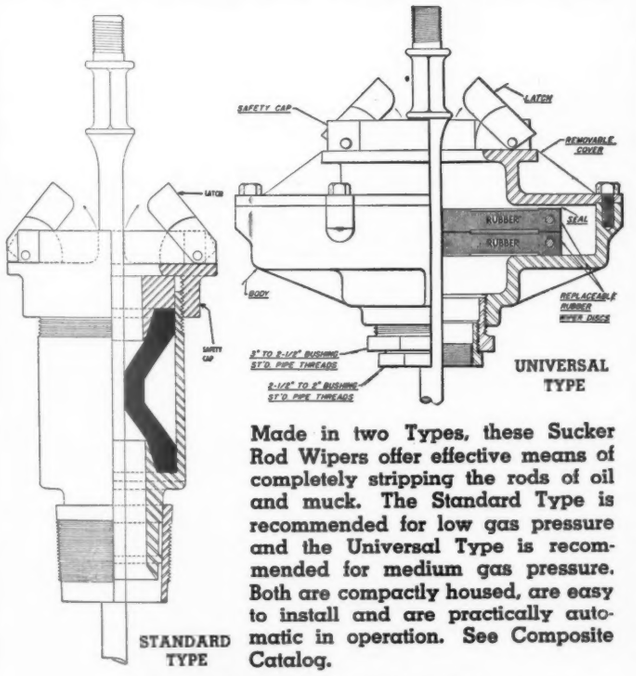

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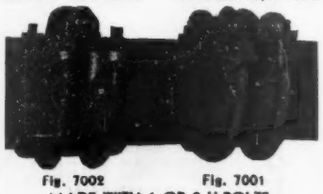

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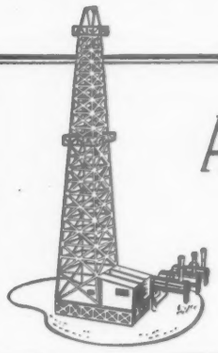

Among the Drilling

Drilling Firm Gets War Contract For West Virginia Salt Wells

FALCON-SEABOARD Drilling Co. of Tulsa has received what is believed to be the first contract awarded an oil-well drilling firm for work directly connected with the war. Under the terms of the contract, Falcon-Seaboard will drill four wells to an approximate depth of 6,500 ft. in the northern part of West Virginia, which will be used to produce salt for the manufacture of chlorine. Chlorine is widely used in domestic and civilian industry in addition to being necessary for the manufacture of munitions and other vital war material.

The chlorine plant is being built under a contract with the Defense Plants Corp., to H. K. Ferguson Co., and will be leased to the Pittsburgh Plate Glass Co. Columbia Chemical Co., a subsidiary of the Pittsburgh firm, will operate the plant.

Drilling of the wells will be under the supervision of A. F. Foltz, of H. K. Ferguson Co. and J. C. Hunter, of Falcon-Seaboard Co. T. N. Law and C. W. Alcorn, president and vice president, respectively, of Falcon-Seaboard, arranged details of the contract.

High Priority Obtained

Because the plant is directly connected with the war effort, materials needed for the work will be available under an A-1-C priority rating. The rotary method was selected for drilling because of the time element, the plant being scheduled to go into operation next February. The cable-tool rigs normally used for drilling in the area are slower and have trouble with hole deviation.

The Falcon-Seaboard organization has more experience in deep rotary work in the area than any other contractor. The rig and crew to be used on the salt-water wells are the same as drilled the deepest hole in West Virginia for the Hope Natural Gas Co. on the Gribble farm in Harrison County to a total depth of 10,018 ft. Since drilling that well the crew and rig have completed two other deep wells for the Hope Natural, one on the Woofter farm to a total depth of 7,325 ft. and one on the Lovett farm which was completed below 7,000 ft. Both 7,000-ft. wells were in the Freemans Creek district, Lewis County.

During the drilling of these three wells study has been given to the design of bits and considerable improvement has resulted. This, coupled with the fact that the formations in the new area are not expected to be as hard as they were in the three previous wells, should lead to a reduction in time. It is expected that from 80 to 90 bits will be required to drill each new hole.

Huntersville-Oriskany Section

Principal barrier to fast completion is the Huntersville chert and the Oriskany sand, both of which lie at the base of the Devonian and a short interval above the salt-bearing Silurian formations.

E. H. Tollefson, in his paper, "Rotary Drilling in the Appalachian Area," delivered before the eastern district A.P.I. meeting April 9, 1942, gives the rate of penetration and the feet per bit for four of the wells drilled by the rotary method in the area. In one well the average was 4 ft. per bit from the top of the Onondaga to the total depth while the rate of penetration was 0.75 ft. per hour through the Onondaga and 1.24 ft. per hour through the Oriskany. On the second well each bit used in the Onondaga made 8.6 ft. and in the Oriskany sand each made 6.6 ft. while the rate of penetration was 2.4 ft. per hour and 2.6 ft. per hour, respectively. In the Gribble well, each bit used in the Huntersville chert average 9.2 ft., in the Oriskany sand 7.1 ft. each and below the Oriskany to the top of the White Medina 56.1 ft. each, and the same bits average 1 ft. per hour, 0.8 ft. per hour, and 2.4 ft. per hour, respectively. On the Woofter well bits used in the Huntersville chert averaged 11 ft., in the Oriskany sand 4 ft. and below the Oriskany, 24 ft.

Average Bit Service

To the top of these hard and abrasive formations the average footage per bit for the five wells drilled was 69 ft. per bit. Total footage drilled to the top of the hard formations was 34,406 ft. and total bits used in drilling the interval was 499. For drilling the hard formations (top of Onondaga or Huntersville to base of Oriskany sand, an average initial of 300 ft.) the bits have averaged 7.38 ft. of hole.

To speed the program, a cable-tool rig may be used to start the second hole while the rotary rig is completing the first one. The rotary can then be moved on the second well and the cable rig used to start the third hole.

The wells to be used for the production of salt will be similar to those used for mining sulfur. They will be completed with two strings of pipe in each well and fresh water will be pumped down one string, dissolve the salt, and return through the other string.

•

WARREN & BRADSHAW Drilling Co., which drilled the discovery well in the Apache field of Caddo County, Oklahoma, for the Texas Co., and which has been carrying the bulk of the drilling in the field, has the contract for the Texas Co. 1 Mah-vo-chu-ky, in SW NE SW of 20-5n-11w, just southwest of the Apache townsite and several miles southeast of the field. The wildcat will seek the Simpson-Wilcox zone.

MANNING & MARTIN, Inc., Denver, Colo., has been awarded contract to drill Carter Oil Co. 1 Semling, in C SE SE of 18-141-81w, northwest of Bismarck, in Oliver County, North Dakota. The contract depth is 7,000 ft.

MID-UNION Drilling Co., Tulsa, is moving in rig for its 1 W. W. Griffin, a 3,500-ft. rotary test, 330 ft. from south and west lines of P. Tackett Survey, Abstract 1255, 5 miles north of Eliasville, Tex.

BUD LEWIS, contractor-operator of Hobart, Okla., has taken farmout from Phillips Petroleum Co. on the W½ NE of 29-7n-17w, and has staked location for the 1 Jones (Burke) in SW SW NE of Section 29. Location is ¾ mile southeast of the Hobart field in Kiowa County, Oklahoma.

B-K-M Drilling Co. has the contract for Phillips Petroleum Co. 1 Ross, in C NE SE of 18-5n-10e, south of the Calvin-Beeker area, Hughes County, Oklahoma, which was drilling at 1,395 ft.

MILAM Drilling Co. was moving in rig to drill the Atlantic Refining Co. 1 Martex-Welder, in Survey 221, in the northeastern part of Duval County, Texas.

E. B. SHAWVER, contractor-operator of Wichita, Kans., was due to start building rotary derrick at his 1 Agin, located in the C NW NE of 33-15-1w, just west of the town of Gypsum, Saline County, Kansas.

RED IRON Drilling Co., Marshall, Tex., has the contract for deepen-

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ing the John Papridikas 1 Sallie Old, Wood County, Texas. The test will go to the Paluxy, expected around 6,250 ft.

TRINITY Drillers, Inc., San Antonio, Tex., is moving a rotary to Webb County, Texas, for Union Oil Co. of California 2-A Volpe, a projected Wilcox test located on the Pescadito structure, 20 miles east of Laredo in Survey 2011.

GEORGE ECHOLS, Houston, Tex., is rigging up at the old Napleonville dome, Assumption Parish, Louisiana, for his 1 Dugas & LeBlanc, in 55-12s-13e. This will be the third test to be drilled by the contractor around this old salt structure which is void of any production.

NOBLE Drilling Co., Tulsa, is contractor for Atlantic 1-A University, a scheduled 8,700-ft. wildcat in Section 9, Block 12, University Survey, 12 miles south by southwest of the Fullerton field in Andrews County, Texas. Derrick was being built last week.

DEAN BROTHERS Drilling Co., Fort Worth, Tex., has started a six-well drilling program in West Central Texas which will keep two of the firm's spudders busy for several months. The wells are scattered among pools of Callahan, Throckmorton, and Shackelford counties.

C. A. HILBURN, Vivian, La., has received contract to drill Steve Reele 1 Fly, a wildcat test in 40-19n-16w, Caddo Parish, Louisiana.

C. L. TISSUE Drilling Co., Inc., Houston, Tex., is expected to start drilling operations on Garvey & Christe 1 Foster Lumber Co., a projected 8,500-ft. Yegua sand test located about 6 miles southeast of the old Humble field, Harris County, Texas.

MORRIS-HAMILTON Drilling Co., Houston, Tex., abandoned Atlantic 1 Cohn, a wildcat west of the Esperson dome in Harris County, Texas, at a total depth of 9,505 ft. In the meantime, drilling continues below 4,770 ft. on a wildcat test located in Hidalgo County, Texas, for Phillips Petroleum Co.

FALCON-SEABOARD Drilling Co., Houston, Tex., has two active operations in the Midway field, Arkansas, for Barnsdall Oil Co., and in West Virginia, near the town of Clarksburg, where a string of 7-in. casing was cemented in a test being drilled for the Hope Natural Gas Co.

CHARLES D. HAGERTY, San Angelo, Tex., was to spud his own Callahan County, Texas, wildcat last week, the 1 R. D. Williams estate, 870 ft. from the north line and 450 ft. from the west line of Bayland Orphan Home Survey, about 1 mile west of Hope sand production in the Hart pool.

J. R. SHARP, Tulsa, has been given the contract to drill a 5,000-ft. test in Lubbock County, Texas, 1¼ miles northwest of the Harrison-Nairn discovery of last August, the county's only producer. The well will be Texas Pacific Coal & Oil Co. 1-A F. W. Austin unit, 660 ft. out of the SE cor. Section 41, Block A, H.&W.T. Survey.

McCAMEY & ICE, Fort Worth, Tex., were expected to begin drilling this week at Eastland Oil Co. 1 R. O'Hair, 2½ miles northeast of the city of Coleman in Coleman County, Texas. The well is contracted to 2,150 ft.

Contractors Urged to Mail Inventory Data

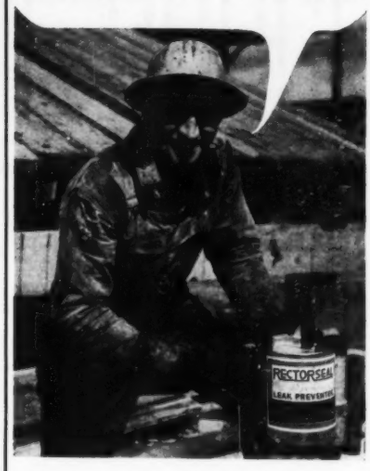
DRILLING CONTRACTORS who have not returned equipment inventory forms to offices of the American Association of Oilwell Drilling Contractors at Dallas, Tex., this week were urged to act promptly.

"The OPC," declared Brad Mills, executive secretary of the association, "recently suggested that the inventory was a matter for this body to handle and added that it would await with interest the consolidation of information received from drilling contractors. The government further suggests that the completed inventory will be a very valuable document, particularly when obtained on the basis of geographical areas.

"The allocation of steel and rubber depends upon the requirements of the drilling industry and unless we can indicate our needs we may find a shortage in the near future.

"The availability of supplies and repair parts and also capital items to our industry depends upon an accurate knowledge of its requirements. There is no means of having such knowledge except through our inventory, or a similar one. The OPC has placed the responsibility on the contractors' association and depends upon us for the data," Mr. Mills concluded.

INSURANCE BY THE GALLON



By applying RECTORSEAL to every mud, oil, water, gas or steam line around your location when you lay it, you're assuring yourself of leak-free days from then on.

RECTORSEAL is unlike any of the many compounds used to protect threads from rust while on the rack and is not intended to compete with them. RECTORSEAL'S job is to *prevent* leaks and act as a lubricant when making up threads. It comes in liquid form, and when applied with a brush or swab, forms a plastic, elastic mass which seals and holds the seal indefinitely.

Instead of waiting for leaks to show themselves, use RECTORSEAL on all connections and forget leak troubles.

You can get this positive leak preventer from your nearest supply store in gallon cans, or in any size to suit your needs. But . . . be sure to *ask for it by name.*

RECTORSEAL
THE POSITIVE LEAK PREVENTER

WEB WILSON *Rotary Tongs*

SCRAP

. . . those old tongs and get the newest. Only half the weight in new tongs. Our Government gains 1000 lbs. on every set scrapped. You gain speed, safety and convenience in WEB WILSON tongs. They save their cost in a year.

See pages 2449 to 2454, Composite Catalog for 1942.

WEB WILSON *Oil Tools*
W. W. WILSON BUILDING
HUNTINGTON PARK, CALIF.

CRUDE-OIL PRICES . . .

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21	....	....	....	....	$.85	$.75	....
21-21.9	....	....	....	....	.87	.78	....
22-22.9	....	....	....	....	.89	.81	....
23-23.9	....	....	....	....	.91	.84	....
24-24.9	....	....	....	....	.93	.87	....
Below 25	$.93	....	....	$.86	....	....	....
25-25.9	.95	.95	....	.88	.95	.90	....
26-26.9	.97	.97	....	.90	.97	.93	....
27-27.9	.99	.99	....	.92	.99	.96	....
28-28.9	1.01	1.01	1.01	.94	1.01	.99	....
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	....
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

COLUMN (1) MID-CONTINENT GRADES:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

COLUMN (2) MID-CONTINENT GRADES:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

COLUMN (3) MID-CONTINENT GRADES:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

COLUMN (4) JACKSON, TILLMAN COUNTIES:
Gulf Oil Corp., 5-20-41.

COLUMN (5) MID-CONTINENT GRADES:
Standard Oil Co., (Indiana), 5-20-41.
National Refining Co., 5-20-41.

COLUMN (6) MID-CONTINENT GRADES:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

COLUMN (7) OKLAHOMA:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland $1.14
Pure Oil Co., 9-4-41.

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
Illinois basin, 5-21-41 ..... $1.37
Eastern Illinois, 5-21-41 ..... 1.22
Western Indiana, 5-21-41 ..... 1.22

Magnolia Petroleum Co.:
Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:
Illinois (Louden), 5-21-41 ..... $1.37
Sohio Corp.:
Illinois basin, 5-21-41 ..... $1.37
Texas Co.:
Illinois basin, 5-21-41 ..... $1.37
Gulf Refining Co.:
Illinois basin, 5-21-41 ..... $1.37

Michigan

Simrall Corp., 5-27-41:
Greendale, Porter, Vernon, Crystal, and Wise $1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet) 1.42
Freeman, Redding, Lincoln, and Winterfield 1.39
Hamilton-Grout 1.29
West Branch-Arenac 1.24
Sohio Corp., 5-1-41:
Bloomingdale-Columbia $1.38
Mid-West Refineries, Inc., 5-1-41:
Kent County $1.38
Pure Oil Co., 5-27-41:
Sherman $1.39
Midland (Midland County) $1.44

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
National lines, 3-26-42 ..... $3.00
Southwest Penn, 3-26-42 ..... 2.65
Eureka lines, 3-26-42 ..... 2.59
Corning grade, 5-27-41 ..... 1.31
Tide Water Associated Oil Co.:
Bradford, 3-26-42 ..... 3.00
Allegany, N. Y., 3-26-42 ..... 3.00
Pennzoil Co.:
Group A, 3-26-42 ..... 2.93
Group B, 3-26-42 ..... 2.92
Group C, 3-26-42 ..... 2.91
Group D, 3-26-42 ..... 2.90
Group E, 3-26-42 ..... 2.88
Quaker State Oil Refining Corp:
In Buckeye lines, 3-26-42 ..... 2.55
In Eureka lines, 3-26-42 ..... 2.59

West Virginia

Pure Oil Co.:
Cabin and Kelly Creek, 3-27-42 ..... $2.59

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	....	....	....	....	....	....	....	....	....	....	....	....	$.94	....	....	....	....	....
18-18.9	....	....	....	....	....	....	....	....	....	....	....	....	.96	....	....	....	....	....
19-19.9	....	....	....	....	....	....	....	....	....	....	....	....	.98	....	....	....	....	....
Below 20	....	....	....	....	....	....	....	$1.06	....	$.94	$.99	$.89	....	....	$1.06	....	....	....
20-20.9	....	....	....	....	....	....	....	1.08	....	.96	1.01	.91	1.00	....	1.08	....	....	....
Below 21	$.68	....	....	$.90	....	....	....	....	....	....	....	....	....	$.90	....	....	....	....
21-21.9	.70	....	....	.92	....	....	....	1.10	....	.98	1.03	.93	1.02	.92	1.10	....	....	....
22-22.9	.72	....	....	.94	....	....	....	1.12	....	1.00	1.05	.95	1.05	.94	1.12	....	....	....
23-23.9	.74	....	....	.96	....	....	....	1.14	....	1.02	1.07	.97	1.08	.96	1.14	....	....	....
24-24.9	.76	....	....	.98	....	....	....	1.16	....	1.04	1.09	.99	1.11	.98	1.16	....	....	....
Below 25	....	$.86	$.98	....	....	$.88	....	....	....	....	....	....	....	....	....	....	....	....
25-25.9	.78	.88	1.00	1.00	....	.90	....	1.18	....	1.06	1.11	1.01	1.14	1.00	1.18	....	....	....
26-26.9	.80	.90	1.02	1.02	....	.92	....	1.20	....	1.08	1.13	1.03	1.17	1.02	1.20	....	....	....
27-27.9	.82	.92	1.04	1.04	....	.94	....	1.22	....	1.10	1.15	1.05	1.19	1.04	1.22	....	....	....
28-28.9	.84	.94	1.06	1.06	....	.96	....	1.24	....	1.12	1.17	1.07	1.21	1.06	....	$1.14	$1.06	....
29-29.9	.86	.96	1.08	1.08	....	.98	....	1.26	....	1.14	1.19	1.09	1.23	1.08	....	1.16	1.08	....
30-30.9	.88	.98	1.10	1.10	$1.26	1.00	....	1.28	....	1.16	1.21	1.11	1.25	1.10	....	1.18	1.10	$1.05
31-31.9	.90	1.00	1.12	1.12	1.28	1.02	....	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	....	1.20	1.12	1.07
32-32.9	.92	1.02	1.14	1.14	1.30	1.04	....	1.32	1.09	1.20	1.25	1.15	1.29	1.14	....	1.22	1.14	1.09
33-33.9	.94	1.04	1.16	1.16	1.32	1.06	....	1.34	1.11	1.22	1.27	1.17	1.31	1.16	....	1.24	1.16	1.11
34-34.9	.96	1.06	1.18	1.18	1.34	1.08	....	1.36	1.13	1.24	1.29	1.19	1.33	1.18	....	1.26	1.18	1.13
35-35.9	.98	1.08	1.20	1.20	1.36	1.10	....	....	1.15	....	....	....	....	1.20	....	1.28	1.20	1.15
Below 36	....	....	....	....	....	....	$1.07	....	....	....	....	....	....	....	....	....	....	....
36-36.9	1.00	1.10	1.22	1.22	....	1.12	1.09	....	1.17	....	....	....	....	1.22	....	1.30	1.22	1.17
37-37.9	1.02	1.12	1.24	1.24	....	1.14	1.11	....	1.19	....	....	....	....	....	....	....	....	1.19
38-38.9	1.04	1.14	1.26	1.26	....	1.16	1.13	....	1.21	....	....	....	....	....	....	....	....	1.21
39-39.9	1.06	1.16	1.28	1.28	....	1.18	1.15	....	1.23	....	....	....	....	....	....	....	....	1.23
40 & above	1.08	1.18	1.30	1.30	....	1.20	1.17	....	1.25	....	....	....	....	....	....	....	....	1.25

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

COLUMN (1) applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village and Lewisville fields.

COLUMN (2) applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek and Nebo.

COLUMN (3) applies to Bunkie, Eola, Olla and South Olla.

COLUMN (4) applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville and Port Allen.

COLUMN (5) applies to University (Baton Rouge).

COLUMN (6) applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

COLUMN (7) applies to Abbeville, Louisiana.

Continental Oil Co., 5-21-41.

Stanolind Oil & Gas Co., 5-21-41.

COLUMN (8) applies to East and West Hackberry.

COLUMN (6) applies to Caddo Parish, effective 10-15-41.

COLUMN (9) applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22-41.

COLUMN (1) applies to Reynolds lime, Jones sand, Schuler, Ark.

COLUMN (2) applies to El Dorado, West and South Rainbow fields, Snow Hill and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

COLUMN (3) applies to Olla.

COLUMN (2) applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

COLUMN (10) applies to Roanoke, Chalkley.

COLUMN (11) applies to Iowa, Black Bayou, White Castle.

COLUMN (12) applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

COLUMN (13) applies to Lockport, Cameron Meadows, and West Gueydan, La.

COLUMN (6) applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 2-19-42.

COLUMN (1), Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.

Gulf Refining Co., 5-21-41.

COLUMN (9), Jennings.

COLUMN (8), Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, Leesville.

COLUMN (16) applies to Grand Bay, Quarantine Bay, Timbalier Bay and West Bay, except schedule starts at $1.12 for below 28° gravity.

COLUMN (6) applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville and El Dorado.

Pure Oil Co. 4-22-41.

COLUMN (14) applies to Gueydan crude.

COLUMN (6), Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

COLUMN (6) applies to North Louisiana.

COLUMNS (15) and (16), Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

COLUMN (17), Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche and Delta Duck Club.

COLUMN (18), Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS

FLAT PRICES

Continental Oil Co., 5-21-41:
Tepetate and Lake Arthur $1.18
Ville Platte 1.20
Gulf Refining Co., 5-21-41:
Smackover (Ark.) $0.83
Lion Oil Refining Co., 5-22-41:
Smackover (heavy) $0.83
Dorcheat 1.15
Phillips Petroleum Co., 5-22-41:
Smackover (heavy) $0.83
Placid Oil Co., 5-22-41:
Tullos-Urania (5-21-41) $1.15
Cotton Valley dist. (above 60°) .. 1.30
Cotton Valley (Holloway sand) .. 1.25
Cotton Valley (Bodcaw-D sands) 1.20
Pure Oil Co.:
Bosco (5-21-41) $1.14
Sweet Lake (5-22-41) 1.06
Creole (5-22-41) 1.16
Republic Oil Co., 6-2-41:
Nevada County, Arkansas $0.80
Shell Oil Co., Inc., 5-20-41:
Happytown $1.15
Standard Oil Co. of Louisiana, 5-22-41:
Big Creek, Dorcheat, McKamie (sour) $1.15
Smackover (heavy) ..... .83
Cotton Valley distillate (9-1-41) 1.40
Cotton Valley (Holloway sand) 1.25
Lisbon distillate 1.20
Republic Oil Refining Co., 5-21-41:
Bayou Pigeon $1.20
Texas Co., 5-21-41:
Erath $1.21
Garden Island 1.36
Lafitte, Paradis 1.19
Lake Mongoulois 1.36

ROCKY MOUNTAIN GRAVITY TABLE

Below 29	$0.96
29-29.9	.98
30-30.9	1.00
31-31.9	1.02
32-32.9	1.04
33-33.9	1.06
34-34.9	1.08
35-35.9	1.10
36-36.9	1.12
37-37.9	1.14
38-38.9	1.16
39-39.9	1.18
40 and above	1.20

Stanolind Oil & Gas Co., 5-20-41, includes Dutton Creek, Midway and Salt Creek except Tensleep crude, Wyoming.

Sinclair Wyoming Oil Co., 5-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 5-21-41, includes Fort Collins and Wellington, Colorado.

Wyoming

Ohio Oil Co.,:
Rock River (5-20-41) $1.18
Lance Creek (7-1-41) 1.12
Elk Basin and Grass Creek (light) 1.0
Stanolind Oil & Gas Co., 5-20-41:
Frannie (light) 7
Frannie (heavy) ..... .47
Grass Creek (light) 1.0
Grass Creek (heavy) 9
Hamilton Dome 4
Elk Basin 1.0
Salt Creek (Tensleep) ..... .678
Continental Oil Co.:
Big Muddy (5-30-41) $1.0
Lance Creek (9-1-41) 1.12

TEXAS GULF COAST GRAVITY TABLE

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$.98	$.93
20-20.9	1.08	1.08	....	1.00	.95
Below 21	....	....	$1.08	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.5	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

COLUMN (1):
Humble Oil & Refining Co., 5-21-41, includes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompsons, Sugarland, Thompsons, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-1-41, includes Clinton where schedule starts at 98 cents for below 21°, regular thereafter.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Pointe, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty and Vinton.

COLUMN (2):
Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Eubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

COLUMN (3):
Pan American Production Co., 5-21-41 includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, in-

cludes High Island, Spindletop, Hastings, and South Houston.

COLUMN (4):

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

COLUMN (5):

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Rosyln.

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27.27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH AND SOUTHWEST TEXAS TABLE EXPLANATION

COLUMN (1) MIRANDO:

Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.

Magnolia Petroleum Co., 5-21-41.

Continental Oil Co., 7-1-41. Includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco Driscoll, O'Hern, Piedre Lumbre, and Taranchauas.

American Mineral Spirits Co., 5-21-41, includes Adami and Munson.

Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

COLUMN (2) REFUGIO:

Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove, and Wade City.

Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth, Saxet, Taft, and Tom O'Connor.

American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White point.

COLUMN (3) REFUGIO:

Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

COLUMN (4) LA ROSA:

American Mineral Spirits Co., 3-29-41.

COLUMN (5) DUVAL-MIRANDO:

Sun Oil Co., 5-21-41.

COLUMN (6) DUVAL-MIRANDO:

Texas Co., 5-21-41.

COLUMN (7) NUECES COUNTY:

American Mineral Spirits Co., 5-21-41.

Republic Oil Refining Co., 5-21-41.

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

COLUMN (1):

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

COLUMN (2):

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41 in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

COLUMN (3):

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

COLUMN (4) TEXAS PANHANDLE:

Magnolia Petroleum Co., 7-9-41.

Continental Oil Co., 7-9-41.

Phillips Petroleum Co., 7-9-41.

COLUMN (5) WINKLER AND LEA:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

COLUMN (6) GRAY COUNTY:

Texas Co., 5-21-41.

H. F. Wilcox Oil & Gas Co. (7-9-41).

COLUMN (7) LEA COUNTY:

Magnolia Petroleum Co., 5-21-41.

COLUMN (8) EDDY COUNTY:

Continental Oil Co., 5-30-41.

COLUMN (9):

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

COLUMN (10) TEXAS PANHANDLE:

Humble Oil & Refining Co., 7-9-41.

COLUMN (11) PANHANDLE:

Sinclair Prairie Oil Marketing Co., 5-23-41.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$.73	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.75	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.77	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.79	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.81	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.83	....
Below 25	....	$0.80	....	....	....	....	....	$0.80	....	....	$0.83
25-25.9	.82	.82	.82	....	$0.82	....	....	.82	....	.85	.85
26-26.9	.84	.84	.84	....	.84	....	....	.84	....	.87	.87
27-27.7	.86	.86	.86	....	.86	....	....	.86	....	.89	.89
28-28.9	.88	.88	.88	$0.91	.88	....	....	.88	$0.88	.91	.91
29-29.9	.90	.90	.90	.93	.90	....	....	.90	.90	.93	.93
30-30.9	.92	.92	.92	.95	.92	....	....	.92	.92	.95	.95
31-31.9	.94	.94	.94	.97	.94	....	....	.94	.94	.97	.97
32-32.9	.96	.96	.96	.99	.96	....	....	.96	.96	.99	.99
33-33.9	.98	.98	.98	1.01	.98	....	....	.98	.98	1.01	1.01
34-34.9	1.00	1.00	1.00	1.03	1.00	$1.03	1.00	1.00	1.00	1.03	1.03
35-35.9	1.02	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.02	1.05	1.05
36-36.9	1.04	1.04	1.04	1.07	1.04	1.07	1.04	1.04	1.04	1.07	1.07
37-37.9	1.06	1.06	....	1.09	1.06	1.09	....	1.06	....	1.09	1.09
38-38.9	1.08	1.08	....	1.11	1.08	1.11	....	1.08	....	1.11	1.11
39-39.9	1.10	1.10	....	1.13	1.10	1.13	....	1.10	....	1.13	1.13
40 and above	1.12	1.12	....	1.15	1.12	1.15	....	1.12	....	1.15	1.15

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8
Below 20	....	....	....	....	$.80	....	....	....
20-20.9	....	....	....	....	.82	....	....	....
Below 21	....	....	....	....	....	$.81	....	....
21-21.9	....	....	....	....	.84	.83	....	....
22-22.9	....	....	....	....	.86	.85	....	....
23-23.9	....	....	....	....	.88	.87	....	....
24-24.9	....	....	....	....	.90	.89	....	....
Below 25	....	....	$.88	....	....	....	$.89	$.95
25-25.9	$.91	....	.90	$.97	.92	.91	.91	.97
26-26.9	.93	....	.92	.99	....	.93	.93	.99
27-27.9	.95	....	.94	1.01	....	.95	.95	1.01
28-28.9	.97	.97	.96	1.03	....	.97	.97	1.03
29-29.9	.99	.99	.98	1.05	....	.99	.99	1.05
30-30.9	1.01	1.01	1.00	1.07	....	1.01	1.01	1.07
31-31.9	1.03	1.03	1.02	1.09	....	1.03	1.03	1.09
32-32.9	1.05	1.05	1.04	1.11	....	1.05	1.05	1.11
33-33.9	1.07	1.07	1.06	1.13	....	1.07	1.07	1.13
34-34.9	1.09	1.09	1.08	1.15	....	1.09	1.09	1.15
35-35.9	1.11	1.11	1.10	1.17	....	1.11	1.11	1.17
36-36.9	1.13	1.13	1.12	1.19	....	1.13	1.13	1.19
37-37.9	1.15	1.15	1.14	1.21	....	1.15	1.15	1.21
38-38.9	1.17	1.17	1.16	1.23	....	1.17	1.17	1.23
39-39.9	1.19	1.19	1.18	1.25	....	1.19	1.19	1.25
40 and above	1.21	1.21	1.20	1.27	....	1.21	1.21	1.27

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

COLUMN (1) WEST CENTRAL AND NORTH:

Humble Oil & Refining Co., 12-11-41, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.

Panhandle Refining Co., 12-11-41, in Leuders area.

Gulf Refining Co., 12-11-41.

Sinclair Prairie Oil Marketing Co., 12-11-41.

COLUMN (2) NORTH TEXAS:

Continental Oil Co., 12-11-41.

Magnolia Petroleum Co., 12-11-41.

Panhandle Refining Co., 12-11-41.

Bell Oil & Gas Co., 12-11-41.

Texas Co., 12-11-41.

COLUMN (3) EAST CENTRAL:

Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.

Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

COLUMN (4) EAST CENTRAL:

Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

COLUMN (5) EAST CENTRAL:

Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

COLUMN (6) NORTH TEXAS:

Stanolind Oil Purchasing Co., 12-11-41.

COLUMN (7) FISHER COUNTY:

Shell Oil Co., Inc., 12-11-41.

COLUMN (8) MEXIA:

Sinclair Prairie Oil Marketing Co., 5-30-41.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41 ..... $1.35

(Continued on Page 107)

STANDARD OIL CO. OF CALIFORNIA

CRUDE-OIL PRICES EFFECTIVE MAY 23, 1941

(All gravities above those quoted take highest price offered in that field)

Gravity	Signal Hill (Long Beach)	Wilmington	(El Segundo)	Seal Beach	Huntington Beach	Inglewood	Playa Del Rey	Olinda-Brea Canyon	Athens-Rosecrans	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills, Midway-Sunset, Lakeview area	Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Elwood Terrace
14-14.9	....	$.68	....	....	$.71	....	....	$.70	....	$.70	$.70	$.70	$.72	....	....	....	....	....	$.73	$.73	$.73	....	....	....
15-15.9	....	.71	....	....	.75	$.76	....	.72	....	.72	.71	.72	.72	....	....	....	....	....	.73	.73	.73	....	....	....
16-16.9	....	.74	$.79	....	.79	.79	....	.75	....	.74	.73	.75	.72	....	....	....	....	....	.73	.75	.73	....	....	....
17-17.9	....	.78	.82	....	.82	.82	....	.78	....	.77	.76	.78	.72	....	....	....	....	....	.75	.78	.73	....	....	....
18-18.9	$.80	.82	.86	....	.86	.85	....	.81	....	.80	.79	.82	.74	....	....	....	....	....	.78	.81	.73	....	....	....
19-19.9	.84	.86	.90	....	.89	.88	....	.85	....	.83	.82	.85	.77	....	....	....	....	$.73	.81	.84	.75	....	....	....
20-20.9	.88	.90	.94	....	.93	.92	$.80	.88	....	.86	.85	.89	.80	....	....	....	....	.76	.85	.87	.77	....	....	....
21-21.9	.92	.94	.98	....	.96	.95	.84	.91	....	.89	.89	.92	.84	....	....	....	....	.79	.90	.90	.80	....	....	....
22-22.9	.96	.98	1.02	$.88	.99	.98	.87	.95	....	.93	.93	.96	.87	....	....	....	....	.83	.94	.93	.83	$.76	....	....
23-23.9	1.00	1.02	1.05	.92	1.02	1.01	....	.98	....	.97	.98	1.00	.91	....	....	....	....	.87	.99	.96	.86	.80	....	....
24-24.9	1.03	1.06	1.07	.97	1.05	1.04	f.o.b.	1.01	....	1.01	1.02	1.03	.94	$.99	....	....	....	.90	1.03	.99	.89	.83	....	....
25-25.9	1.07	1.09	1.10	1.01	1.08	1.07	our	1.04	....	1.05	1.06	1.07	.98	1.02	....	....	....	.94	1.07	1.01	.92	....	....	....
26-26.9	1.11	1.12	1.12	1.06	1.11	1.10	pipe	1.08	....	1.09	1.10	1.11	1.01	1.06	....	....	....	.97	1.11	1.04	.95	....	....	....
27-27.9	1.15	1.15	1.15	1.10	1.14	1.14	line	1.11	....	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	1.07	.98	....	....	....
28-28.9	1.18	1.18	1.18	1.15	1.17	1.17	....	1.14	....	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.10	1.00	....	....	....
29-29.9	1.20	1.21	....	1.19	1.20	1.20	....	....	$1.17	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.13	1.02	....	....	....
30-30.9	1.23	1.24	....	....	1.23	1.22	....	....	1.21	....	....	....	1.15	1.21	1.15	$1.01	$1.09	1.10	1.28	1.16	1.04	....	....	f.o.b.
31-31.9	....	....	....	....	....	1.24	....	....	1.25	....	....	....	1.19	1.24	1.19	1.04	1.12	1.14	....	....	1.06	....	....	ship
32-32.9	....	....	....	....	....	....	....	....	1.29	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	....	1.09	....	....	....
33-33.9	....	....	....	....	....	....	....	....	1.32	....	....	....	1.27	....	1.26	1.10	1.17	....	....	....	1.11	....	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	1.36	....	....	....	1.31	....	1.30	1.13	1.20	....	....	....	1.13	....	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	....	....	$1.23	1.28
36-36.9	....	....	....	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....	....	....

Standard posts 73 cents for all grades at Newhall, Kern River, Kern Front, McKittrick and Round Mountain.

Personal Paragraphs

MAJ. LEE A. ADAMS, district scout for Sinclair Prairie Oil Co. at Oklahoma City, Okla., reported for duty last week at Will Rogers Field, where he will be personnel officer. He is succeeded by HARRY A. NORRIS, recently transferred from Wyoming.

W. K. HOLMES, superintendent of the West Tulsa refinery of the Texas Co., says that he believes his plant has established an all-time record in safety, the plant having passed 1,002,559 man hours without a lost-time accident. The plant operated 648 days between July 18, 1940, and April 28, 1942, with a clear record.

HENRY L. PHILLIPS, vice president, Sinclair Refining Co., has purchased a new residence on Grace Church St., Rye, N. Y.

A. I. LEVORSEN, consulting geologist of Tulsa, delivered the commencement address last week at the sixty-eighth annual commencement of the Colorado School of Mines, at Boulder.

THAD VREELAND, who entered employ of General Petroleum Corp. as a chemist in 1923 and who has been district sales manager of the Colton, Calif., district has been appointed manager of fuel-oil sales in the marketing department.

L. B. PARK, of Houston, Tex., has joined the staff of Atlantic Refining Co. at Midland, Tex., as geophysicist, succeeding A. E. McKAY, who had gone into the Army as a lieutenant. Mr. Park is a former resident of Midland.

N. P. WHALEY, who has been in charge of the Tulsa office of Sands Petroleum Co., has been elected a vice president and director of the firm. The election was announced by WILLIAM HUTCHINSON and RAY H. BEEMAN, president and vice president, while they were in Tulsa on a visit from New York City.

PAUL WEAVER, Gulf Oil Corp., Houston, Tex., newly elected vice president of the American Association of Petroleum Geologists, addressed members of the Fort Worth (Tex.) Geological Society last week on the subject: "The Evaporite Series; Their Influence on War Economy With Particular Reference to Potash and Magnesium Deposits in Germany."

BUELL F. JONES, general counsel of Standard Oil Co. of Indiana, has been elected to membership on the board of directors. LOUIS L. STEPHENS, advisory counsel, retired from the board but will continue to reside in Chicago and thus be available for consultation should the occasion arise. Mr. Jones joined the company in 1930 as an attorney, and was the senior general attorney when promoted to general counsel in 1940. He is a native of South Dakota and is a graduate of its state university.

OTIS LILLY, former Panhandle scout for Stanolind Oil & Gas Co. at Amarillo, Tex., resigned last week as chairman of the Panhandle Oil Scouts Association and left to enter a naval training school. T. M. CRAWFORD, Panhandle scout for Humble Oil & Refining Co., was elected to fill the chairmanship of the scouts.

R. S. (BOB) CHRISTIE, division engineer for Texas and New Mexico, Amerada Petroleum Corp., with headquarters at Fort Worth, Tex., has received orders to report May 11 to Fort Rosecrans near San Diego, Calif., where he will be on active duty as a first lieutenant in the Coast Artillery. Mr. Christie was commissioned in the U. S. Army Reserve after training at University of Pittsburgh.

MARVIN ROMBERG has arrived at his home in Gonzales, Tex., with two suitcases of absolute necessities and memories of a harrowing experience which began February 23, when he, with 200 others, secured passage from Batavia, Netherlands East Indies, on a small cattle boat to Australia. Mr. Romberg was connected with an oil company in Sumatra and he assisted in destroying the oil wells in Palembang before he left, just one jump ahead of the Japs.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Illinois Pipe Line Co. may construct a pipe line from Wyoming oil fields to Iowa to connect with a line extending to Whiting, Ind.

To guard against possible shortage in fuel oil, a San Diego utilities company proposes to store a large quantity of oil in one of the big tanks at the company's plant in that city.

At Pittsburgh, Pa., on May 1, makers of pipe announced another advance of $10 a ton. The last formal change in price previous to this one was made a month before when independents raised the price $10 a ton.

20 YEARS AGO

The sixteenth annual convention of the American Gas Association will meet in Kansas City, Mo. The convention is expected to attract more than 1,000 members of the industry. L. B. Denning is president of the organization.

The Arkansas, Louisiana & Texas Development Co. has been organized for the purpose of further developing the North Louisiana gas district. Walter L. McCloy, Tulsa, formerly general manager of Philadelphia Gas Co., is president of the new company, which is capitalized at $6,000,000.

The new refinery of Sierra Oil & Refining Co., 50 miles west of Los Angeles, Calif., is advanced so far toward completion that the refining of oil has started in the plant. Construction will continue, however, for some time.

10 YEARS AGO

Plans are practically complete for the convention of the National Oil Scouts Association which will be held in Houston May 15. John Langston, Sun Oil Co., is president of the association.

Shell Petroleum Corp. has just started construction at its Houston, Tex., refinery of a new gasoline absorption plant for the recovery of waste gases. The unit will replace the compression equipment now in service.

E. C. WELLS, engineer, Carter Oil Co., at Magnolia, Ark., has been called for Army service, and is now a lieutenant at Fort Benning, Ga.

H. E. GREENWOOD is the new manager of the Valley Pipe Line Co., at McAllen, Tex. He came from the Louisiana oil fields to succeed NEIL STALLARD.

J. A. LaFORTUNE, vice president, Warren Petroleum Corp., Tulsa, attended the Kentucky Derby last week, accompanied by Mrs. LaFortune.

F. A. SANDBERG, of E. W. Saybolt & Co., with offices in Houston, Tex., was a Tulsa visitor last week, when refining and natural-gasoline executives were here.

C. V. LEE, San Angelo, Tex., president of the Lee Petroleum Corp., was able last week to go to a hotel from a hospital in Houston, Tex., where he had undergone treatment for the past 4 weeks.

CAPT. B. B. HOWARD, vice president, Standard Oil Co. of New Jersey (Del.) and manager of the marine department, has been elected a director of the Maritime Association of the Port of New York.

GEORGE L. GARDINER, department manager, distilling units, at Shell's Martinez, Calif., refinery, has been appointed superintendent of the company's Shellburn, B. C., refinery, and will make his future headquarters in Vancouver, B. C.

S. R. HARDING has resigned as sales manager of Olympic Refining Co., with which he was connected for the past 11 years, and has joined H. A. McOWEN, of Harbor Refining Co., to operate with Comet Oil Co. in the distribution of Comet products in the five western states.

J. W. STOKER, production superintendent for Sinclair Prairie Oil Co., at Shidler, Okla., has been transferred to the Cushing district, with headquarters at Drumright, Okla.

T. A. MORGAN, formerly division engineer for the Houston Natural Gasoline Corp., Houston, Tex., has been promoted to valuation engineer, succeeding the late Charles H. E. Horn.

DR. CAREY CRONEIS, professor of geology at University of Chicago, addressed the Tulsa Geological Society Monday night. The subject of his address was "Geology in War and Peace."

LAWRENCE WOLFF, assistant sales manager of Union Oil Co. with office in Los Angeles, Calif., has been granted a leave of absence, having been called to duty as a lieutenant commander of the U. S. Navy.

FRED BRASTED, geologist with Phillips Petroleum Co., and CARL A. McADAMS, scout with Sinclair Prairie Oil Co., will both leave Midland, Tex., May 8 for Fort Bliss to enter an Army officers' training camp.

STUART P. COLEMAN, director of the department of economics, Standard Oil Co. of New Jersey, has been granted a leave of absence from the company to devote his full time to the PIWC subcommittee on petroleum economics of which he is chairman.

MRS. HARRY C. WIESS, wife of the president of the Humble Oil & Refining Co., christened the Standard Oil Co. of New Jersey's new 18,500-ton tanker, Esso Richmond, which was launched April 27, at the Sun Shipbuilding & Dry Dock Co. yards at Chester, Pa.

C. Z. WEBB, refinery superintendent of St. Helens Petroleum Co., resigned some time ago to become welding inspector in the California Shipbuilding Corp., and has a number of welders under his supervision who were formerly drillers and roughnecks in California fields.

Named Board Member

J. A. Neath, formerly vice president of the Humble Pipe Line Co., Houston, Tex., who recently resigned to accept appointment to the board of directors of the Humble Oil & Refining Co., has been associated with the oil industry since he was 16 years old. During the early part of his career he worked for several pipe-line companies during the boom days in West Central Texas. He joined the Humble Pipe Line Co. in 1919 when the Southern Pipe Line Co. became a part of the Humble system. He was appointed division superintendent of the company's operations at Cisco, Tex. In 1924 Mr. Neath was appointed general superintendent and was transferred to the company's headquarters at Houston, Tex. He was elected to the board of directors of the pipe-line company in 1925 and was made vice president in 1928, a position he held until promotion to the board of the parent company.

J. A. NEATH

During the years in which Mr. Neath was a top executive with the pipe-line company, Humble's system was expanded substantially, including construction of crude-oil trunks from West Texas, New Mexico and East Texas to the Gulf Coast. Normally, Humble Oil & Refining Co. is the largest purchaser of Texas crude and the largest producer from its own properties. The task of moving approximately 150,000,000 bbl. annually through Humble's pipe-line facilities was under direct supervision of Mr. Neath.

Mr. Neath was born at Red Rock, Pa., November 17, 1896. He is married and has two sons. Robert, 22, is a junior mechanical engineering student at Rice Institute, while Jack, 13, is attending Kinkaid School.

Mr. Neath who is known by his many friends as "Jap" is an ardent sportsman and active civic worker. He has been active in Community Chest drives for many years, and headed the drive 3 years ago to raise funds for the new St. Thomas High School. He is a past president of the River Oaks Country Club.

FRED W. PETERS, treasurer, Oklahoma Natural Gas Co., has been elected president of the Tulsa Symphony Association.

GEORGE McLEAN, clerk in the scouting office of Carter Oil Co. at Wichita, Kans., has resigned to enter the civilian phase of the Army Air Corps at Wichita.

DONALD BAIRD, of Warren Petroleum Co., Tulsa, who is a member of the Civilian Air Patrol, assisted in the rescue work following the tornado that struck Pryor, Okla., last week.

JOSEPH McHUGH, commissioner of the Louisiana Department of Conservation, was principal speaker at the meeting of the Caddo Wildlife Association at Shreveport, La., last week.

GEORGE V. HOLTON, vice president of Socony-Vacuum Oil Co., Inc., and Mrs. Holton have announced the engagement of their daughter, Mary, to Frank E. Beane, of Greenwich, Conn.

CAPT. A. A. NICHOSON, assistant to the vice president of the Texas Co., is making a series of addresses throughout the Mid-Continent, in which he is urging the purchase of war bonds.

CAPT. CHARLES DWIGHT McCABE, formerly president of the Golden Petroleum Co., San Angelo, Tex., is now stationed as an air base group officer at the U. S. Army Air Force bomber base at Will Rogers Field, Oklahoma. Mr. McCabe was called from reserve status April 8. He was commissioned second lieutenant during the first World War.

A reorganization of the natural-gas and gasoline department of Magnolia Petroleum Co., in Dallas, Tex., was announced last week. The department was split into two new divisions — the natural-gas department, with R. D. HANLEY as manager, and the gas pipe-line department, with D. E. WEST as manager. Both will continue to keep their headquarters in Dallas.

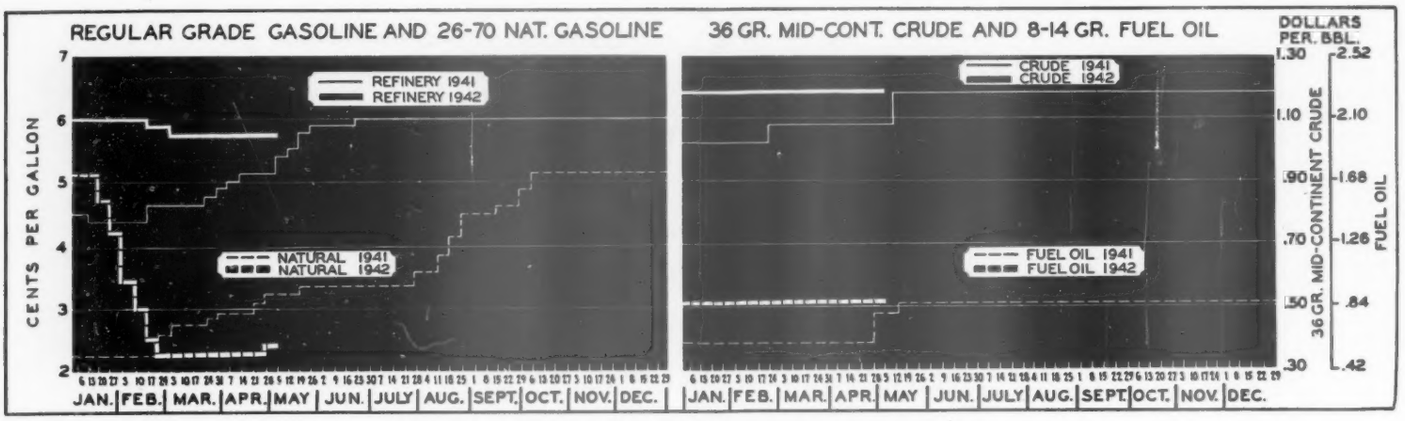
N. W. SHIARELLA, president of the Kentucky Oil and Gas Association, and a partner in the independent firms of Miller & Shiarella and Basin Drilling Co., has been appointed a "Kentucky colonel" by Gov. Keen Johnson. This is in honor of the untiring efforts of the appointee in the interest of the oil and gas industry in Kentucky.

W. S. ZEHRUNG, president, Pennzoil Co.; H. J. CRAWFORD, president, Quaker State Oil Refining Corp., and HARRY LOGAN, of United Refining Co., all of Oil City, Pa., have been invited to membership in the Industrial Advisory Board for Petroleum. The board serves in an advisory capacity to government agencies in fashioning the wartime program for the industry. The invitation was extended in telegrams from Leon C. Henderson, price administrator.

GUS B. EVANS, who is 75 years old and has served for the past 30 years as an employe of the Pennzoil Co., Oil City, Pa., has retired from active service with the company. For many years he served as purchasing agent for the concern and in recent years had been head of the shipping department at the Rouseville, Pa., plant.

HENRY W. HAMAN, night superintendent for the heavy-oils division of the Whiting refinery of Standard Oil Co. of Indiana, last week completed 50 years of service with the company. The occasion was honored by the presentation to Mr. Haman of a gold watch by DR. M. G. PAULUS, vice president in charge of manufacturing. Mr. Haman joined the company in 1892, when he was 13 years old. For his first job he received 7½ cents an hour. He was elevated to his present job in 1918.

Shifts: MAX B. EDERINGTON, engineer, Oklahoma Pipe Line Co., Tulsa, to St. Elmo, Ill.; J. P. WAGNON, superintendent, Parker Drilling Co., Fort Stockton, Tex., to Holly, Colo.; H. D. JONES, superintendent, Barnsdall Oil Co., Hope to Patmos, Ark.; H. G. PICKLESIMER, geologist, Arkansas Fuel Oil Co., Hope, Ark., to Shreveport, La.; A. M. SCHAIBLE, engineer, Gulf Oil Corp., Port Arthur, Tex., to Fairview, Kans.; R. L. DALE, geologist, Carter Oil Co., Ord, Neb., to Stockton, Kans.; R. K. TALLANT manager, North Branch Development Co., Grand Rapids, Mich., to Fairfax, Va.; G. F. PHILLIPS, superintendent, Gibbins & Heasley, Imperial, Tex., to Jal, N. M.; LEO W. KONZ, engineer, Carter Oil Co., Hope, Ark., to Jonesville, La.; E. H. SHANNON, engineer, Texas Co., Mission to San Antonio, Tex.; MARK H. O'CONNELL, geologist, Cities Service Oil Co., Livingston, Tex., to Amite, La.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK. — Considerable disappointment over the size of the price increases allowed by the Office of Price Administration last week was generally evident. The increases, ranging from 0.2 per cent per gallon for No. 2 fuel oil to 25 cents per barrel for No. 6 fuel oil, raised New York Harbor quotations to 9.2 cents for 72-74-octane gasoline, 5.9 cents for No. 2 fuel oil, 5.8 cents for diesel oil and $1.80 per barrel for Bunker C fuel oil.

These advances were insufficient to offset the increased transportation costs which have become so burdensome that the closing of some of the larger distributing companies is regarded as imminent. If these companies are forced to pay 85 cents per barrel for No. 6 fuel oil at the Gulf, transport it to New York at a cost of $1.65 per barrel and sell it for $1.80, it is obvious that those with less than very substantial reserves will soon be forced out of business.

The arrival of warmer weather has reduced the call for heating oil and reduced driving as a result of tire rationing has enabled the industry to meet requirements with some withdrawals from storage but the position of residual fuel oil remains critical. While tank-car loadings have increased to around 500 cars per day in contrast to some 60 a month ago, the situation with respect to residual fuel oil continues extremely tight.

Complete ignorance of the basis on which gasoline will be rationed after May 15 is professed but measures which would effect a 50 per cent reduction from last May are regarded as essential. Present deliveries to District 1 are estimated at half the demand of May, 1941. In addition to reducing gasoline consumption to a point not greater than current deliveries into the district, the industry must also begin to add to light fuel-oil storage in preparation for next winter's demand.

Mid-Continent

THE directive issued this week by the Office of Petroleum Coordinator calling for a reduction of 20 per cent in the gasoline production by refineries in District 2 tended to give the Mid-Continent motor-fuel market another stimulant. Purchasers in the northern states have been actively combing the market for several days seeking sources of additional supplies. Movement of motor fuel is reported brisk in the Chicago area where overland shipments to the East Coast are draining supplies normally restricted to distribution in the Middle West.

Increased movement of motor fuel from Group 3 territory lifted the natural-gasoline market in Oklahoma and Kansas manufacturing areas this week to a firm figure of 2.375 and a few scattered sales, where plants enjoy favorable freight-rate positions, were reported closed at 2.5 cents per gallon.

Natural gasoline is offered in the Breckenridge, North Texas, market at 2 cents per gallon. Movement of several cargoes of gasoline in boats of lend-lease nations was reported from the Gulf Coast which had a tendency to take some of the slack from the natural-gasoline prices prevailing at Gulf Coast, Southwest Texas, and South Louisiana terminals.

Mid-Continent refiners continue substantial loadings of fuel oil for delivery to East Coast destinations. There is a fairly brisk call from Middle West purchasers for kerosene and tractor distillates which are being consumed largely in the agricultural regions. There is evidence, however, that regular gasoline is becoming increasingly popular as tractor fuel, a trend that has been a feature of agricultural demand for the past several years.

Eastern buyers are reported willing to contract for practically all grades of fuel oil offered but stocks are not plentiful in the Mid-Continent and refiners are not pushing material on the market. Purchasers are anxious to build up eastern stocks during the season of low consumption and Mid-Continent refiners may discard their usual custom and continue the production and shipment of distillate fuels through the summer months.

SENTENCE SUMMARIES

MID-CONTINENT: Fuels and gasoline moving briskly. Natural-gasoline price stiffens.

EAST COAST: Gasoline prices permitted to rise 0.4 cent, light fuels, 0.2 cent per gallon and heavy fuels, 25 cents per barrel.

GULF COAST: Navy purchases for lend-lease consignment take slack out of fuel-oil supplies.

PENNSYLVANIA: Western Pennsylvania refiners to start shipping gasoline into eastern area at higher rate.

CALIFORNIA: Prices for gasoline resist pressure of reduced purchasing. Natural gasoline slightly stronger.

A.P.I. REFINERY REPORT

Week Ended April 25, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks Gasoline	Residual	Gas oil
Appalachian	155	4,031	641	389
Ind., Ill., Ky.	712	22,468	3,452	2,548
Okla., Kans., Mo.	358	10,090	1,682	893
Censored group*	1,595	46,694	16,314	13,689
Rockies	96	2,495	589	271
California	590	17,119	58,429	11,450
Total Apr. 25, 1942	3,506	102,897	81,107	29,240
Total Apr. 18, 1942	3,548	103,502	82,577	29,929
Total Apr. 26, 1941	3,709	96,172	92,324	31,066

Note: Refinery runs and stocks for week ended May 2, 1942, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana Gulf, North Louisiana-Arkansas and Inland Texas at request of OPC.

Gulf Coast

HOUSTON, Tex.—Heavy purchases by the Navy are reported to have depleted fuel-oil stocks on the Gulf Coast this week. Most of this material consisted of Bunker C fuel and gas oil, the latter being used as blending material to meet Navy specifications. The Navy is reported to have acquired large stocks of fuel oil and other refined products over a period of several weeks and continues to purchase extensively. This is the second large movement of fuel oils by the Navy Department but details as to how much material was lifted were not available.

While movement of fuel oils should make available much needed storage, the crude situation is still acute, and this was emphasized Saturday by a 50 per cent reduction on purchases of all grades in Southwest Texas by Humble Oil & Refining Co. While there is a good demand for material, movement by tank cars and barges has not been in sufficient volume to take care of reduced refinery runs and additional cuts by other major purchasers may become necessary.

Pacific Coast

LOS ANGELES, Calif.—Gasoline prices showed some strengthening this week and a further firming is expected. The reason is a reduction in the amount of distress crude oil on the spot market and the production committee hopes to have all operators in line before it becomes necessary to ask the petroleum coordinator to take action against recalcitrants.

Fuel oil continues in good demand and at the ceiling of prices dictated by the OPA.

Diesel and gas oil have been showing stronger tones because of the use of these products as blending agents with residual fuel to meet Navy specifications. Stocks of diesel and gas oil showed substantial accumulations in 1941 and present use will enable marketers to reduce stocks during the next several months.

Natural gasoline, with only a limited supply available in the spot market is fairly strong but is moving in small lots.

General market conditions quiet and spotty with additional consolidations of operations between independent refiners who have found it advantageous to shut down several less efficient plants and contract for their processing requirements with other plant operators.

REFINERY AND TANK-WAGON PRICES

(Prices as of May 5)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & lower
Mid-Continent*				5.500-5.625		5.125-5.250	4.750-4.875
Pennsylvania			6.750-7.000				
Gulf Coast‡	6.00-6.50			§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	9.700			9.200	9.200		
Pacific Coast		6.500-6.750	6.125-6.250	6.250-6.500	5.750-6.250	5.000-5.250	4.500-4.750

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	2.375	2.750-2.875	
North Texas	2.000	2.375-2.500	
North Louisiana	2.125	2.500-2.625	
California			5.000-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.500-4.750	4.375-4.625	
North Louisiana				4.500-4.750	
Pennsylvania	6.250	6.125-6.250			
California				4.500-6.000	4.500
Northeast Coast				5.700	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125					
California		2.750-4.000			‡$1.35-1.45	$0.80-0.90
Gulf Coast			4.000	4.125	1.45	0.85
Northeast Coast				5.800	2.222	1.80
North Louisiana						†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.500-3.625	3.375-3.500	$0.85	$0.85
Pennsylvania (West)	5.625-5.875	5.375-5.875	†5.250-5.500	
Northeast Coast	5.8	5.8	1.85	1.80
Pacific Coast	5.5	5.5	‡0.75-95	§0.80
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00 9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):	
10 pour point	30.50
15 pour point	29.50
25 pour point	25.00 28.00
Steam refined:	
600	15.00 16.00
650	15.50 16.50
600 flash	16.00 17.50
630 flash	17.00 17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Wax

(Cents per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	4.350-4.550

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250

Neutral Oil

CALIFORNIA—

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	38.50
10 pour point	37.50
15 pour point	36.50
25 pour point	31.00
200 vis., at 70° F., 3 color:	
Zero pour point	40.50
10 pour point	39.50
15 pour point	38.50
25 pour point	33.00

NEW YORK—

Wax in bags fully refined:	
130-132 (A.m.p.) wax	6.250
133-135 (A.m.p.) wax	6.550
Crude scale:	
124-126 (A.m.p) w.s.	4.350-4.455
124-126 (A.m.p.) y.s.	4.350-4.455

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast		6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel			Bunker
	41-43	24 G.	48-52 D.I.	58 D.I. Bunkers	C grade
Gulf Coast	4.000-4.250		4.125-4.375	4.375 $1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30		†1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S.R.
Mid-Continent	16.8		28.8	24.8	
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kerosene tank wag.
Baltimore, Md.	15.05	5.50	9.10
Boston, Mass.	14.50	4.50	8.40
Burlington, Vt.	16.50	5.50	...
Buffalo, N. Y.	15.80	5.50	9.20
Dover, Del.	16.30	5.50	10.80
Hartford, Conn.	15.20	4.50	...
Manchester, N. H.	16.90	5.50	9.40
Newark, N. J.	14.30	4.50	8.30
New York, N. Y.	15.70	5.50	8.40
Philadelphia, Pa.	15.80	5.50	10.55
Pittsburgh, Pa.	16.30	5.50	10.90
Portland, Me.	15.90	5.50	8.50
Providence, R. I.	14.60	4.50	8.20
Washington, D. C.	14.30	3.50	9.60
Average 14 cities	15.51	5.07	9.28

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kerosene tank wag.
Chicago, Ill	14.10	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	11.90	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.03	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky and Louisiana)

	Dealer tank wagon	Combined tax	Kerosene tank wag.
Atlanta, Ga.	19.00	7.50	9.40
Birmingham, Ala.	19.60	8.50	9.00
Charleston, S. C.	18.55	7.50	...
Charleston, W. Va.	18.85	6.50	11.90
Charlotte, N. C.	19.70	7.50	9.90
Jacksonville, Fla.	19.00	8.50	8.40
Jackson, Miss.	18.00	7.50	8.50
Louisville, Ky.	17.00	6.50	8.50
Memphis, Tenn	17.75	8.50	10.50
New Orleans, La.	17.25	8.50	*10.00
Norfolk, Va.	17.05	6.50	10.60
Average 11 cities	18.34	7.59	9.67

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kerosene tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kerosene tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.53	5.96	10.30
Average last week	16.37	5.96	10.30

Crude-Oil Prices

(Continued from Page 103)

Agua Dulce (heavy), 10-16-41 ..... $1.25
Republic Oil Refining Co., 5-21-41.

Alfred and Magnolia City $1.35
Continental Oil Co., 5-21-41.

Alice, Benavides (North Sweden), Ben Bolt, Clark-Mull, Sun, and Tom Graham $1.35
Humble Oil & Refining Co., 5-21-41.

Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou .. $1.25
Sun Oil Co., 5-21-41.

Cass County $1.20
Texas Co., 5-21-41.

Cayuga, Anderson County $0.90
Pan American Production Co., 5-21-41.

Chapel Hill, Smith County:
Crude distillate $1.30
Crude oil 1.18
Chapel Hill Gas System, 11-7-41

Clay Creek, Washington County ... $1.00
Sun Oil Co., 5-21-41.

Cleveland, Liberty County $1.26
Magnolia Petroleum Co., 5-21-41.

Conroe, Montgomery County $1.43
Humble Oil & Refining Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.

Cotton Lake (South) $1.35
Sun Oil Co., 5-21-41:

East Texas and Flag Lake* $1.25
**Humble Oil & Refining Co.*, 5-21-41.
Pan American Production Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Sinclair Prairie Oil Marketing, 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Stanolind Oil Purchasing Co.

Esperson (35° and above), South Esperson $1.30
Sun Oil Co., 5-21-41.

Flour Bluff, East Flour Bluff $1.33
Humble Oil & Refining Co., 5-21-41.

Hockley and Cochran $0.87
Texas Co., 5-21-41.

Livingston and Mercy $1.25
Shell Oil Co., Inc., 5-20-41.

Long Lake $1.23
Sinclair Prairie Oil Marketing, 5-21-41.

Luby $1.35
American Mineral Spirits Co., 5-21-41.

Luling $1.05
Magnolia Petroleum Co., 5-21-41.

Lytton Springs $1.17
Magnolia Petroleum Co., 5-21-41.

Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski $1.14
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
**Texas Co.*, 5-21-41.

Rincon (North), Sun, North Sun and Garcia $1.35
Sun Oil Co., 5-21-41.

Yturria $1.45
Sun Oil Co., 3-19-42.

Talco $0.79
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.

Tomball and Satsuma $1.40
Humble Oil & Refining Co., 5-21-41.
**Magnolia Petroleum Co.*, 5-21-41.
Stanolind Oil Purchasing Co., 4-1-41.

Van, Van Zandt County $1.08
Humble Oil & Refining Co., 5-21-41.
Pure Oil Co., 5-21-41.

Yates (regular) $0.95
Humble Oil & Refining Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Shell Oil Co., Inc., 5-20-41.

Yates (shallow) $0.82
Shell Oil Co., Inc., 5-20-41.

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
Big Sandy River $1.38
Kentucky River 1.43
Sohio Corp., 5-21-41:
Birk City $1.15

Montana

Continental Oil Co., 4-1-41:
Cat Creek $1.18

Colorado

Stanolind Oil & Gas Co., 5-20-41:
Iles $1.07
Continental Oil Co., 5-21-41:
Canon City-Florence $1.05

Canadian Fields

Imperial Oil, Ltd.:
Petrolia, 11-6-39 ..... $2.10
Oil Springs, 11-6-39 ..... 2.07
Bothwell, 11-6-39 ..... 2.10
Turner Valley, 7-16-41 ..... $1.35-1.97

EQUIPMENT PROGRESS...

Unit Rig Line Is Expanded By 6,000-ft. Motohoist Job

Unit Rig & Equipment Co., Tulsa, has added a 6,000-ft. capacity Motohoist to its expanding line of well-servicing units. It embodies all the general characteristics of the 4,000-ft. hoist recently brought out, and

in addition to running rods and tubing to the capacity depth, it is also suitable for swabbing or bailing to 6,000-ft. Unit Rig's exclusive Air-O-Matic clutch is standard for this well-servicing job. Among the particular features in the unit is the two-speed and throttle control on one lever, positioned at the wellhead alongside brake control lever. By this arrangement, the time of one crew man is saved.

TRADE LITERATURE

READING-PRATT & CADY, Reading, Pa., division of American Chain & Cable Co., of Bridgeport, Conn.—The first of a series of bulletins designed to specifically instruct industry on how to properly maintain and repair valves. It also includes safety notes on valves and data on valve simplification.

GATO VALVE CO., 1430 Oliver Building, Pittsburgh, Pa.—A 20-page illustrated catalog and price list on the line of Cadman valves. A price list for repair parts is also included.

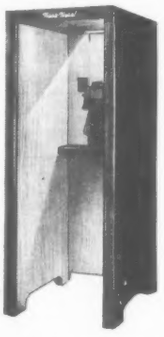
GATKE CORP., 228 North La Salle St., Chicago, Ill. A new catalog covering brake blocks and liners for trucks, tractors, trailers, and other heavy-duty equipment. For quick reference the part numbers of Gatke Custom-Bilt brake block sets are alphabetically listed by make, year, and model. In addition, special recommendations give specifications of liners required for each shoe, with suggestions for meeting emergency requirements with multiple-coverage sets.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., East Pittsburgh, Pa.—A 64-page 1942 revision of the Quick Selector Catalog. Issued twice a year, this catalog simplifies the selection of many types of electrical equipment. A number of additions and changes have been made in the April 1942 edition which make the catalog more useful than ever before. The general subjects covered include: safety switches, no-fuze breakers, multibreakers, panel boards, motor control, and motors. New application data, on latest equipment in each of these groups, has been included. The general format of the catalog has been retained. Electrical ratings, physical dimensions, and circuit diagrams expedite the selection of correct equipment for each purpose.

De Luxe Industrial Model Acousti-Booth by Burgess

A new wooden Acousti-Booth, finished in walnut color, is announced by Burgess Battery Co., Acoustic Division, 2825 West Roscoe Street, Chicago, Ill.

The walls and ceilings in the new Model 210 Acousti-Booth are constructed of heavy reinforced birch plywood panels, filled with a thick blanket of sound-absorbent material. The inside walls of the booth consist of a heavy perforated plywood facing, which protects the sound-absorbent material. This combination of perforated plywood and the sound-absorbent material which it protects is a patented Burgess development. These acoustic panels blot up factory noise and create a remarkable "zone of quiet" in the booths.



This booth is designed for use in mills, factories, powder houses, and other noisy industrial locations. It has no doors because it needs none. Factory racket is absorbed so completely by the lining of the booth that telephone calls can be made without interference, even under severe noise conditions. Error due to confusion in phoned orders is eliminated. Privacy is assured because conversation in ordinary tones within the booth cannot be understood outside.

The open, doorless construction allows ample ventilation. Maintenance is practically eliminated, because there are no locks, hinges, or other mechanical parts to cause trouble. These booths are designed with rounded corners and sturdily built to prevent damaging when used in busy shops or factories.

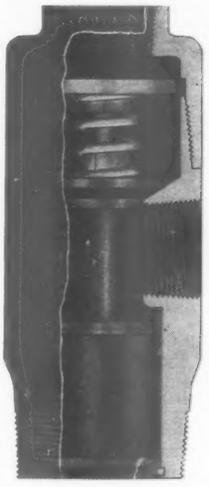
The booth may be obtained unfinished to permit finishing to suit individual requirements. A shelf is provided for the telephone instrument and for taking notes. Overhead electric-light fixture with pull chain provides ample illumination. Outside dimensions are 30 in. wide by 79½ in. high by 38 in. deep. The front opening is 24 in. wide. Approximate shipping weight is 225 lb.

Lift-Model Drum Carrier Eases Loading and Moving

A dual-purpose lift-model carrier for placing and removing 55-gal. drums on and off skids, scales and platforms, has been announced by Ernst Magic Carrier Sales Co., Buffalo, N. Y. It has a new, patented lifting device which raises the containers vertically 14 in. off the floor into a locked position, eliminating many accidents common to handling loaded drums and barrels. The device operates by lowering the handle from the straight horizontal position. With it one man takes the place of several formerly required to move and raise drums. The operator does not touch the container. The model augments the standard line of Ernst Magic drum and barrel carriers.

Warren Automatic Valve Aids In Controlling Drilling Mud

A new automatic valve to stop or start the flow of water going into the mud stream the instant circulation is stopped or started, has been announced by Warren Automatic Tool Co., Houston, Tex. This valve is designed for the purpose of aiding in keeping the mud weight and viscosity uniform and saving money on weighting material and time.



During shutdown periods, the possibility of forgetfulness or negligence to stop the water running in the mud ditch is completely eliminated. The valve also gives assurance that the correct proportion of water will be resumed the instant circulation is restored.

The valve is compactly built, being only 12 in. in length by 5 in. in diameter. There is a 2-in. pipe connection in the top for the water to enter and one in the side for the outlet to the mud ditch. At the bottom there is a 4-in. threaded male connection for attaching the valve directly to the mud line from the pumps. Within the body of the valve at its lower end is a 3-in. mud piston. This piston acts directly against a water-valve disk, which is normally held in a closed position by a spring. A tough rubber insert assures a positive water shutoff. The interior of the valve is so constructed to provide an unrestricted 2-in. flow of water. The pressure from the mud pumps operating against the mud piston and in turn the water-valve disk, opens same and permits the water to flow through the valve. As the mud pressure is released, the spring acts to return the valve to its normally closed position.

France Manufacturing Co. Specializes in Metallic Packings

The France Manufacturing Co., Belgrade and Orthodox Streets, Philadelphia, Pa., is owned and operated by E. A. France, son of the late A. W. France, an old-timer in the metallic-packing business.

Mr. France has been active in the development of packings for 15 years, during which time metallic packings have been changing from creations of guesswork to the scientifically sound and correctly designed packings of today.

Much of the progress of the company has been identified with the gas industry. One of the outstanding contributions of this company was the gas-engine fire check. They introduced a sheathed bronze fire check about 5 years ago. To their knowledge no rod has ever had to be remachined on which this fire check was installed, nor has a fire check been reported to have worn out.

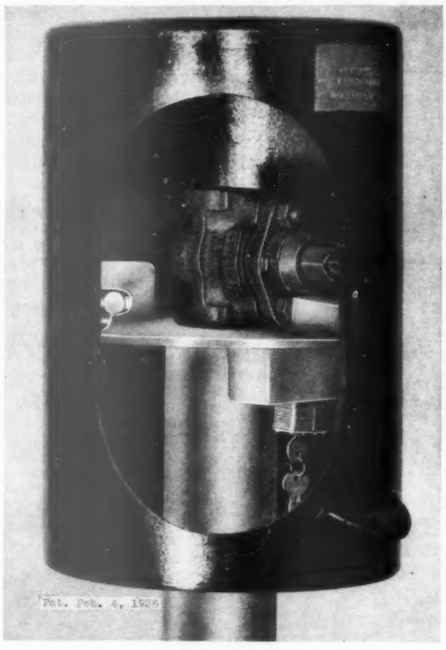
Another important development of the company was the manufacture of carbon-bakelite packing and piston rings.

Carbon-bakelite is a phenol-formaldehyde material containing an abundance of fine carbon particles. Packing and rings made of it are immune to the effects of sour gas. Carbon-bakelite polishes the rods and gives extremely long life in compressor service.

To maintain its rate of production throughout the year the plant is installing air-conditioning equipment.

New Item Safeguards Against Unauthorized Tampering With Drips

The Solor Safeguard drip can is offered as a solution to the perennial problem of drip thieves at points on wet-gas transmission lines. Details of construction



and installation are shown in the accompanying illustration. Many field installations over the last several years have proven the efficiency of this item. It is manufactured by Solor Specialties, Box 1321, Seminole, Okla.

Announce Rechargeable Storage Battery for Flashlights

A rechargeable flashlight battery similar in principle to the well-known automobile storage battery is announced by the Ideal Commutator Dresser Co., 1522 Park Avenue, Sycamore, Ill. Because the Ideal battery represents a permanent source of energy for flashlights, interest in this type of cell is greatly increased because of the war and possible blackouts.

Although small in size to fit all popular two-cell 1⅛-in. Size D flashlight cases, it is proven through actual heavy-duty service to be dependable, long-lived and economical. Large users of flashlights can enjoy big savings through the use of the Ideal battery for it can be charged time and time again. In heavy use, one discharge is equal to a pair of ordinary dry cells. The rechargeable feature makes it convenient to use only while light is bright, and charge again when light gets dim.

An ingeniously arranged chamber and vent, plus semifixation of the electrolyte, makes it spillproof. The plates are over ¼ in. thick and connected to terminals by reinforced electrodes so that the battery is rugged to withstand rough handling. The case is of transparent Lucite. All batteries are "use conditioned" at the factory just like an automobile engine is broken in on the block.

A small charger consisting of transformer and rectifier plates makes it easy to keep the battery always fully charged. Merely plug into convenient 110-volt 60-cycle wall socket. The recommended charging time is 12 hours, for which the cost is only about 1 cent per charge based on a 5-cent kilowatt-hour rate. A clip is also available for charging from a 6-volt automobile battery. For large users a "gang charger" can be supplied. Address inquiries to Ideal Commutator Dresser Co., 1522 Park Avenue, Sycamore, Ill.

Absolute Pressure Gage Is Added to Brown Line

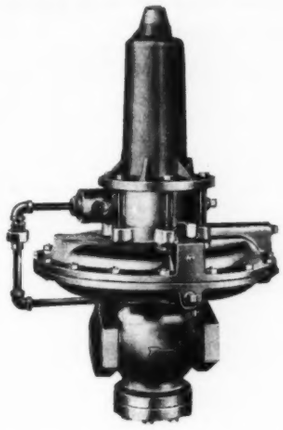
An absolute pressure gage, designed to meet the need of the petroleum, chemical, power and other industries for an instrument to measure accurately and control pressures which are low enough to be affected seriously by variation in barometric pressure (pressure below standard atmospheric pressure) has been added to the line of indicating, recording and control instruments manufactured by Brown Instrument Co., Philadelphia, Pa.

Except for the actuating element, the instrument resembles any standard Brown pressure gage. This element is a spring and bellows assembly which consists of an upper evacuated bellows (sealed at nearly a perfect vacuum) containing the calibrating spring, and a lower actuating bellows to which a connection to which the measured pressure is made. The top of the evacuated bellows and the bottom of the actuating bellows are rigidly fixed to supporting castings, while adjacent ends of each bellows are attached to a moving plate which transmits movement of the bellows to the recording pen by means of a linkage. This linkage is such that an upward movement of the plate removes the recording pen toward the center of the chart.

Because of the low pressure to be measured, it was necessary to exert considerable care in the selection of material and the method of construction. An unusually flexible bellows is used so that the element response is determined principally by the calibrating spring rather than by the bellows characteristics. The bellows are carefully matched for effective area and movement under vacuum. The company has just issued a bulletin, No. 70-11, which describes the instrument.

Pittsburgh Equitable Meter Co. Introduces New Regulator

Pittsburgh Equitable Meter Co., 400 North Lexington Avenue, Pittsburgh, Pa., has announced the addition of a high-pressure series to the present line of EMCO "1001" gas-pressure regulators.



As in the standard "1001" regulator, this model is furnished either for outlet or inlet-pressure control. This high-pressure series regulator, which provides an outlet-pressure range of up to 60 lb. per sq. in. maximum, is so designed as to cover the entire span between 5 lb. and 60 lb. with the same spring.

It is furnished in one size only with 2-in. threaded connection for standard pipe. The manufacturer states that this regulator can be used to control air, manufactured or natural gas.

AMONG EQUIPMENT MEN...

Caterpillar Tractor Promotes Jackson and Nash

Appointment of E. W. Jackson to the position of assistant to the president, and the promotion of D. O. Nash to succeed Mr. Jackson as general service manager, is announced by L. B. Neumiller, president, Caterpillar Tractor Co., Peoria, Ill.

E. W. JACKSON

D. O. NASH

The appointments are effective immediately.

Mr. Jackson had been general service manager of Caterpillar since January 1937. A native of Aikin, Md., and a graduate of Johns Hopkins University at Baltimore, Mr. Jackson, after finishing college, served as junior engineer for the U. S. War Department, becoming proof director of the ordnance department at the Aberdeen proving ground. In this capacity he became familiar with Caterpillar products, and in 1929, when the company's diesel engines were in an early experimental stage, took a position in the Caterpillar research laboratory at San Leandro, Calif.

When the laboratory was transferred to Peoria in 1933, Mr. Jackson moved to this city and entered the service department a few months later.

Mr. Nash was born in the San Joaquin Valley, California, and is an alumnus of Oregon State University. After 7 years in the service department of Cousins Tractor Co., Caterpillar distributor in California, he joined Caterpillar Tractor Co. at San Leandro in 1937. He served 2 years as field service representative, before taking a position as service and parts manager for Peterson Tractor & Equipment Co. at Hayward, Calif. In November 1940 he joined the field service division of Caterpillar at Peoria. He has also served as manager of the service development division and manager of the service engineering division.

Reed Roller Bit Co. Names Harris Mid-Continent General Salesman

D. R. (Dave) Harris has been appointed Mid-Continent general salesman of Reed Roller Bit Co., with headquarters in Tulsa. He was formerly located at the company's plant in Oklahoma City, Okla.

Mr. Harris replaces Fred L. Tyler, who has been transferred to the Los Angeles, Calif., branch as division manager.

D. R. HARRIS

Zimmelman Addresses Tulsa Nomads

M. Zimmelman, in charge of the Argentina operations of the Armco International Corp. with headquarters in Buenos Aires, was the principal speaker at a luncheon of the Tulsa Nomads held April 28 in Tulsa. Mr. Zimmelman is spending several weeks in the United States before returning to Buenos Aires.

CLASSIFIED ADVERTISING

THE MARKET PLACE OF THE OIL INDUSTRY . . .

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LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark. 20 acres up. dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years Experience
Inquiries Invited
B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

FOR SALE: Oil and gas leases, small production, drilling propositions, fluorspar and rock asphalt deposits. Reports and maps furnished on request. W. P. Harley, Bowling Green, Ky.

EAST TEXAS 9,000 ft. Paluxy-Trinity sand wildcat. Quick bet for 10 to 50 for one. E. CROFT, PROCTOR, TEXAS.

CHEAP CRANE COUNTY Sec. 18, B28, under Magnolia-Stanolind leases. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Tex.

OIL INVESTMENT OPPORTUNITY $50.00 will buy oil lease on townsite lot or royalty spread large tract all near deep test well to drill in Hunt County, Texas, immediate future. If interested write Guy J. Stumpff Co., Box 23, Commerce, Texas.

OPERATORS: WE HAVE 4000 acres full geology and geophysical shows structure high developing R. M. area. Will farm or partly finance drill 3000 ft. Box A-984, The Oil and Gas Journal, Tulsa, Oklahoma.

MICHIGAN—1,160 ac. to lease for Oil and Gas. Map free. Owner: L. J. Meldrum, 8354 Epworth, Detroit, Mich.

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

DEEDED ROYALTIES
State Oil & Gas Leases
Harry S. Wright, Farmington, N. M.
REGISTERED ROYALTY DEALER

INQUIRIES invited to buy or sell producing royalties, Illinois preferable. J. A. Wolf, 407 S. Dearborn St., Chicago, Ill.

Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog samples on request. Burkhart Ptg. & Sta. Co., 115 S. Cinn., Tulsa, Oklahoma.

IT'S A FACT—

that year after year these columns carry more Classified Advertising than the combined totals of all other media devoted to the oil industry. RESULTS account for this remarkable record. Write for rates

Classified Department

The Oil and Gas Journal
Tulsa, Oklahoma.

Oil Industry Printing

OIL FIELD LEGAL BLANKS
Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should communicate with AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

OUT OF 5000 American financial houses only 223 bought small issues last few years. The 223 names $4.00. JOHN F. MORRIS, Box 5411, Philadelphia.

Situations Wanted

LAND MAN desires connection with responsible operator, independent or major company. Twenty years' experience actual field work and as supervisor leasing activities for various companies and independent operators in Oklahoma, Texas, Louisiana and Arkansas. Thoroughly familiar with land titles, curative instruments, etc. Administrative ability and experience. Now on special assignment for major oil company. Age 44. Box A-973, The Oil and Gas Journal, Tulsa, Okla.

OIL ACCOUNTANT: 24 years' experience, 19 years with present company as Chief Accountant and Secretary. Company engaged in all phases of oil industry. Can furnish excellent references, age 41, married, desire position with reputable company that will offer broader opportunities. Box A-982, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

LARGE NEW YORK engineering firm requires chemical engineers age preferably 25-30 with any following experience:

1. Petroleum refinery experience in operation or design of stabilizers, absorbers and light end equipment.

2. Refinery experience in design or operation of plants for solvent dewaxing and solvent extraction of lube oils.

3. Refinery experience in design or operation thermal or catalytic cracking plants. In reply state education qualifications and refinery experience in detail. Also salary expected and status regarding military service.

Box A-972, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Maintenance Engineer, experienced in general refinery maintenance, design and construction. Must understand repair and cleaning of cracking units, internal combustion engines, and all types of pumping equipment. Box A-953, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

DESIGNERS AND DRAFTSMEN

For Oil Refinery work carrying high priority ratings of A-1-A and A-1-B under

Government Defense Program

Working 56 hours 3 weeks per month and 44 hours one week with time and one-half for work in excess of 40 hours per week.

Must have experience in design of:

Oil Refinery Process Piping,
Concrete and Structural,
Oil Heating Furnaces,
Pressure Vessels,
Electrical Control
and
Light and Power
Conduit Systems.

Can use several piping squad leaders. Must be thoroughly experienced on piping design and layout.

ARTHUR G. McKEE & COMPANY
Engineers & Contractors
OIL REFINERIES
BLAST FURNACES
STEEL PLANTS
2300 CHESTER AVENUE
CLEVELAND, OHIO

Manufacturers' Agent

MANUFACTURERS' Representatives known to the best oil trade desired for quality specialties now being sold to the best oil field trade, repeat items, excellent commissions, exclusive territories open. Box A-983, The Oil and Gas Journal, Tulsa, Okla.

Incorporation

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

For Sale—Maps

EXECUTIVES MAP of the PERMIAN BASIN showing sections, oil wells, dry holes, drilling wells in blue, pool names depth, year discovered and no. wells, company lease blocks and date of expiration, Ordovician tests in red. Size 3 x 4 feet, Scale 4½ miles to inch. Price $5.00.
SOUTHWEST MAPPING CO.,
FT. WORTH, TEX.

Equipment Wanted

WANTED
Large Steel Storage Tanks and Structural Steel Buildings.
GREENSPON'S
National Stock Yards
(St. Clair County), Ill.

WANTED — Wichita or Jumbo Ft. Worth Spudder with tools and power or just machine. The larger the better. Walter A. Hale, Box 2437, Cut Bank, Mont.

WANTED TO BUY: TRANSPORT TRUCKS WITH MINIMUM CAPACITY OF 3,000 GALLONS. Box A-981, The Oil and Gas Journal, Tulsa, Okla.

WANTED: 2 Ingersoll-Rand XOB Compressors. State size of cylinders and condition of compressors. Box A-980, The Oil and Gas Journal, Tulsa, Oklahoma.

WANT small portable rotary capable of 500' 6" hole, under $1000.00, also small swivel, hose, 4 x 5 or 4 x 6 pump, reply Box 254, Powell, Wyoming.

For Sale—Equipment

FOR SALE: 5½ Keystone Spudder with Hercules Engine and special Cotta Transmission and extra heavy mast. Tools from 10" down, Electric Plant and miscellaneous equipment. Veeder Supply & Development Company, P. O. Box 270, Cherryvale, Kansas.

LOOK

BRAUER PORTABLE DRILLING RIG COMPLETE with 2500'—3½ drill pipe; two drill collars; 5 x 12 Wilson-Synder Pump powered by Caterpillar Motor; Light plant; Steel Tool House; Water Pump; Water Tank; 1200'—2" Water line; Steel substructure; Lumber, etc.

BRAUER MACHINE & SUPPLY CO.
Box 1469, Oklahoma City, Okla.

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE at Bartlesville: 15 oak drafting tables, $35 each. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 125 H.P. 200 W.P. Broderick Boiler, Code Condition, $975. Melton Supply Co., Seminole, Okla.

FOR SALE: 9 miles of first class 3" line pipe with recessed couplings, perfect threads, and standard weight line pipe. 20 miles 2" line pipe, first class condition. The Interstate Pipe & Supply Company, P. O. Box 611, Marietta, Ohio.

FOR SALE

Complete Repressuring or Air Lift Plant for Immediate Delivery

2—13 & 5½x12 Ingersoll-Rand XOB compressors 400# pressure V-belt driven by 120 H.P. Chicago Pneumatic 3-cylinder vertical engines.
2—12 & 7x10 Chicago Pneumatic 400# pressure vertical compressors direct connected to 120 H.P. 3-cylinder Chicago Pneumatic vertical gas engines complete.
Used very little—excellent condition.

Earl E. Knox Company
ERIE, PENNA.

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Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

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1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

REFINERY EQUIPMENT—TOWERS—HOT OIL PUMPS
BUBBLE TOWERS—STABILIZERS—ABSORBERS—GRAY TOWERS

3′ to 8′ Diameter x 24′ to 74′ Height x ¼″ to ¾″ Shell Thickness, Riveted and Welded Reaction Chambers, 4″ and 5 3/16″ Thick, 4′ x 44′ and 5′ x 45′

3—24″ x 5″ x 24″ Worthington Hot Oil Pumps, Completely Reconditioned

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry or H. J. Galamba
Riverview at Second, Kansas City, Kansas

Robt. W. Duden
2100 S. Union, Tulsa, Oklahoma

ALL OR ANY PART—COMPLETE 2000 BBL. REFINERY

Bubble Tower 5′x52′x⅜″ — 21 Trays With Caps Chrome Alloy — 2000 bbl. Pipe Still, 2½″ ID x 2 15/16″ OD x 20′ Tubes Alloy Headers — 8 Heat Exchangers, 255 sq. ft. ea. All New Tubes — Complete Copper Sweetening Unit — New Carload Ethyl Plant — 47 Storage Tanks from 500 to 15000 bbl. cap. — 30 Pumps All Types — Valves — Fittings — Pipe — 5 Transport Trucks Good Tires.

THE PLAINS OIL & REFINING CORPORATION
GREAT BEND, KANSAS

OIL TRANSPORTS

4—Diamond T tractors, 10 wheels, good tires. Capacity 77 bbls. each.

SONKEN-GALAMBA SUPPLY CO.
TULSA, OKLAHOMA

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio

FOR SALE: 1—25 HP Westinghouse Sleeve Bearing Weatherproof type "CS" Electric Oil Well Pumping Motor, Serial #1134267; Class 3553; 3-phase; 60 cycle; 220/440 volt, 1150 R.P.M. Practically new. Box 390, Blackwell, Oklahoma.

FOR SALE
35 H.P. Superior Gas Engine and 16 foot Band Wheel Power. Condition A-1. The Geo. McGinley Supply Co., Bowling Green, Kentucky.

FOR SALE: 110 HP Int. Motor PA-100. Full equipment. Almost new. A-1 condition. $1700 f.o.b. Salem. Box 278, Salem, Ill.

FOR SALE at Oklahoma City: 1—100 H.P. Kewanee 200# W.P. oil field type boiler. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE at Bartlesville: 1 model 1312 photostat machine. Complete $750. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 12 K.W. Portable Light Plant powered by 35 H.P. International Engine. Melton Supply Co., Seminole, Okla.

FOR SALE: COMPRESSOR UNITS near Crane, Texas: 3—90 H.P. Clark tandem 2-stage gas engine compressors and 3—Vertical 100 H.P. Model T-37 Clark gas engines direct connected to Vertical 2-stage Clark compressors. Cities Service Oil Company (Pennsylvania), Houston, Texas.

FOR SALE: 1 Motor driven rotary drilling rig; suitable for 6,000 ft. work. Melton Supply Co., Seminole, Oklahoma.

FOR SALE: 1 Askenia Type Magnetometer #7970, $750.00. Cities Service Oil Co., Bartlesville, Okla.—H. D. Patridge.

NEW POWER UNITS
Four Caterpillar gasoline motors, new, 75 H.P. complete with governors, master clutch, carburetor, and magneto, not mounted, suitable for power unit; $395.00 each. O. C. Evans, Mt. Sterling, Ky.

FOR SALE: At Oklahoma City, 2 85-HP, 175 lb. Oil Field Type Boilers, just shopped. $850.00 each. H. D. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: Wilson-Mogul Drawworks with water cooled brakes and 100 H.P. International Motor. Melton Supply Co., Seminole, Oklahoma.

2800 FEET, 3½″ OD 13.30# Seamless Interior Upset Drill Pipe. All 21′ 9″ joints. Never drilled. Some tool joints. Current price, less 20%. Sorrento Petroleum Corp., American Bank Bldg., New Orleans, La.

REFINERY TOWERS
From
RODESSA REFINERY, SHREVEPORT, LA.

1—CRACKING CHAMBER—6′0″ x 65′ 4¼″ overall, self-supporting. Head and shell thickness 1 13/16″. Quadruple riveted, double strap butt joints. Seams and rivets welded inside and outside.
1—BUBBLE TOWER—6′ 0″ x 56′ 4¾″, self-supporting. 19 trays, first four trays have 18-8 stainless steel caps. All remaining trays have cast iron caps. Head thickness, 1⅞″. Shell 1⅝″. Quadruple riveted, double strap butt joint. Seams and rivets welded inside and outside.
1—VAPORIZER—6′0″ x 34′0″ overall, self-supporting. Head thickness 1 11/16″. Shell thickness 1⅝″. Quadruple riveted, double strap butt joint. All seams and rivets welded inside and outside.

ALSO AVAILABLE FOR IMMEDIATE DELIVERY:

3½″ OD Alloy cracking tubes, Series 7000 K4B Key headers, Pumps, Valves, Fittings, Refinery Specialties, Fractionating Towers and Absorbers.

WE SOLICIT YOUR INQUIRIES FOR ALL REFINERY EQUIPMENT

BROWN-STRAUSS CORPORATION

At (Cedar Grove) Shreveport, La.
Phone 7-7334
Morton I. Glass, Resident Engineer

Main Office: Kansas City, Mo.
LD. Phone 169
Harry B. Strauss, Manager

FOR SALE

20,000′ 12¾″ O.D. lapweld pipe.
5,000′ 7″, 24 lb. seamless casing.
5,000′ 2½″ seamless upset tubing.
300 sets 3″ tool joints, full hole.
200 sets 3″ full hole tool joints.

Both steam and power drilling rig. A complete line of drilling and pumping equipment.

Wire, write, or phone the

Louisiana Iron & Supply Company
Shreveport, Louisiana

FOR SALE: At Bartlesville, two 40-gallon Soda and Acid "Ajax" Fire Extinguishers mounted on wood wheels. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: Near Sasakwa, Okla., 1 Cooper Gas Engine, Type G-40, 400-HP, with or without Compressor Cylinders. Patridge, Cities Service Oil Co., Bartlesville, Okla.

BOILERS: 3—520 HP 180# WP. Water Tube Type, ERIE CITY 2-Drum, Nat'l Board ASME CODE Built in 1925 in service short time, 378—3″ tubes each dismantled.

5—90 HP 150# WP Locomotive Type Full open fire box Nat'l Board ASME CODE Mass Std built by Johnston Bros Ferrysburg, Mich. in 1929 light service. 139—2¼″ x 9′ tubes each.

Large stock good used Boiler Tubes all sizes.

ARIZONA WELDING WORKS
120 S. 4th Ave., Pheonix. Ariz.

FOR SALE: 1 Southwest Gasoline Distillation Unit, complete; Type 25; Shipping Weight, 34,000 lbs. Double Eagle Refg. Co., D. L. Kelly, Oklahoma City, Tel. 2-9070.

I have sold second-hand alloyed once run Okla City Sucker rods to the largest independent oil producers in Kansas, Okla. & Texas, five producers have bought from 50 to 300,000 ft. all with good results. I am subject to call at anytime. I will dispose of the balance of ¾″, ⅞″ & 1″ in truck load lots delivered to your location on 60 days trial, for about half of new price. Your use subject to the approval of my engineer. Can also be used for pull rods. Six 2½″ x 7″ Guiberson tubing catchers and six 2½″ x 7″ sucker rod overshots.

MIKE TRAVIS
1702 S. Boulder Tulsa, Okla.
Phone 2-2447

FOR SALE: 1 Wilson-Atlas Rig and Derrick, complete, with 2 225-HP Buda Engines. 4000 ft. 4½″ Drill Pipe. Condition A-1. Baldwin-Reed Drilling Co., 314 Waggoner Bldg., Wichita Falls, Texas.

A REAL BARGAIN!

8—24 yd. (or 74,600#) all steel DUMP CARS: one side discharge
Ideal for coke handling. Bargain!
OTHER DUMP CARS (air operated) TOO.
IRON & STEEL PRODUCTS, Inc.
37 years' experience
13412 S. Brainard Ave., Chicago, Ill.
***ANYTHING* containing IRON or STEEL**

BESSEMER Gas Engine & Compressor Type 8 50 HP and 80 HP d. c. units complete or in part. HTKS Magnetos, force feed lubricators, etc. GILBERT PIPE & SUPPLY, Electra, Tex.

ONE portable rig, dual motor, complete, good for 2000 ft. 1300 ft. 2½″ drill pipe, Hughes Acme Tool Joints. Sutter Well Works, Pass Christian, Miss.

FOR SALE: Near Barnsdall, Okla., 5 Safety Pulling Machines, $25.00 each. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE: 90 ft. L. C. Moore Cantilever Derrick. Drilled 1 well. Baldwin-Reed Drilling Co., 314 Waggoner Bldg., Wichita Falls, Tex.

FOR SALE: Pressure Vessels handling 100 pounds working pressure 8′ diameters 31′ 8″ lengths. Rectangular tanks, capacity 25,000 gallons and 40,000 gallons each. 26 tons I beams one carload. 12-inch I beams 13′ 2″ long. 36-in. I beams in 22, 36, 38 foot lengths. I beams $61.00 ton, f.o.b. here, approx. 27 tons. Shipments made same day purchased. HARVEY BROS., 706 Rudd, Canon City, Colo.

FOR SALE: 2—12″ x 30″ Class C R gas or air cylinders complete with fittings for Ingersoll-Rand compressor. Holly Oil Company, Huntington Beach, California.

EQUIPMENT HEADQUARTERS
OIL FIELD—INDUSTRIAL

Compressors
Waukesha Engines
Engine-Generator Units
Electric Motors

COMPLETE LINE OF REBUILT OIL FIELD EQUIPMENT

CARSON MACHINE & SUPPLY CO.
Oklahoma City, Okla.

FOR SALE: 2—steam rotary drilling rigs capable of drilling 4100 feet. Menke Estate, 603 Waggoner Bldg., Wichita Falls, Texas. Phone 3883.

100,000 ft. 12¾″ O.D. x ⅜″ Used Lapweld Steel Line Pipe single random, Harrisburg, Pa. 10,000 ft. 30″ O.D. x ⅜″ New Buttweld Steel Pipe 30 ft. lengths, Philadelphia, Pa.
ALBERT PIPE SUPPLY CO., INC.
Berry and N. 13th Streets
Brooklyn, N. Y.

50,000 FEET of 2″ 4.70# 10 V thread upset used seamless tubing.
FT. WORTH PIPE & SUPPLY CO.
Ft. Worth, Tex.

Reconditioned, Tested and Guaranteed Gate Valves for sale. Large stock, sizes 12″ to 2″, flanged end and screw end, various pressures.

THE GATE VALVE SHOP
120 Tuke Box 1936
Pampa, Texas

FOR SALE: Compression Booster Plant; Complete Unit with three 90 H.P. 2-Stage Chicago Pneumatic Compressors; 25 HP Superior Auxiliary gas engine; Light Plant; Circulating Pumps; Coils; 2 Eight thousand gallon Gasoline storage tanks; Structural Steel Building. This Unit only operated twelve months and is in A-1 mechanical condition. Write or call T. P. McAdams, Okmulgee, Okla.

122 FT. Tubular Steel Derrick. Rent by month, or for sale. Double Eagle Refg. Co., D. L. Kelly, Okla. City. Tel. 2-9070.

HAVE remaining only 2500 feet 20″ O.D., ⅜″ Wall .35-.45 Carbon Steel Pipe P.E. in 50 ft. length good for low pressure line. Also Quantity Dresser Couplings, Ells and Valves. Subject to prior sale.

Write—Wire—Or Phone

BROWN-STRAUSS CORPORATION
Kansas City, Missouri

EIGHTY extra heavy 3½″ Key Headers, Jenkins Bubble Tower, Flash Tower, two Boilers and Settings, 2 Treating Towers, quantity of Valves and Fittings. Western Tank & Road Supply Co., Wichita, Kansas, or F. E. Reinhardt, General Delivery, Evansville, Ind.

Journalisms:

LAST week the Journal editorially recommended the appointment of Harold L. Ickes as a member of the War Production Board. The editorial was widely quoted in newspapers, and at least one editor wrote in to tell us why he liked it. This editor commented as follows:

"In view of the severe criticism and hostility on the part of many persons within the oil industry upon the appointment of Secretary Harold L. Ickes as petroleum coordinator . . . your commendation of his program and your suggestion that he be made a member of the War Production Board should enhance the Journal's rating as 'the voice of the industry.' I heartily agree with the sentiment and suggestion made in your editorial of April 30, and compliment you in taking the initiative to give credit to a public official who has labored in the interest of the industry and its personnel."

Several men in the industry also wrote in to express their approval of the editorial. T. H. Barton, president, Lion Oil Refining Co., wrote that he "heartily agrees . . . and hopes this will be done immediately." Colonel Barton further commented: "Oil is one of the most vital necessities for the proper conduct of our war. Mr. Ickes has devoted many years to the study of this situation and has become well acquainted with the general operations of this industry, and I am sure it would be a great addition to the War Production Board to have his counsel and advice. I thoroughly approve of this editorial and hope that our president will see the value of having Mr. Ickes on the War Production Board."

C. L. Henderson, president, Vickers Petroleum Co., and president also of the Western Petroleum Refiners Association, expressed himself as "very much in accord" with the editorial. However, Mr. Henderson ventured the opinion that "a still better plan would be to have the Office of Petroleum Coordinator take over the activities of the War Production Board in so far as the oil industry is concerned, and, in addition, be permitted to handle the price situation without the industry having to go before the Office of Price Administration. The two most important things in which the industry is interested are the supply of materials, and prices. The OPC has been staffed with people who are familiar with the problems, and much red tape, confusion, and delay could be eliminated if these activities could all be concentrated in the OPC. Leon Henderson is a very busy man and has about the toughest job of anybody in the country, and he no doubt would welcome relief from the problem of oil prices."

•

OIL men in recent weeks have been recipients of a variety of honors. Two weeks ago an Oklahoman was acclaimed "champion liar" of a civic club, for which doubtful honor he was presented with a silver loving cup. Last week a Texan was knighted by an order consecrated to revering the Lone Star State's era as a republic, and this week comes word that a Kentuckian has been appointed a Kentucky colonel, suh.

•

A Japanese "invasion" on our own shores is given as one of the reasons for canceling the summer meeting of the Society of Automotive Engineers. The meeting had been scheduled to be held at White Sulphur Springs, W. Va. The invasion is limited to enemy diplomats, who were in the country when war broke out, and who are now "guests" of the nation at the eastern resort. However, a series of local meetings will replace the planned general meeting.

•

EVIDENCES of the tightening of civilian economy on Monday when the president issued the order banning manufacture of numerous consumer items throws more importance than ever on the maintenance of industrial equipment, particularly the machinery with which the petroleum industry drills its wells and produces, transports and refines the crude oil.

Recognizing this necessity, the Journal will continue publishing items on equipment maintenance. Next week the repair of stainless steel items will be described in an article in the Engineering and Operating Section of the Journal.

CALENDAR

May

NATURAL GASOLINE ASSOCIATION OF AMERICA, Mayo Hotel, Tulsa, May 14-15.

KENTUCKY OIL AND GAS ASSOCIATION, annual midyear meeting, Lexington, Ky., May 22.

WEST TEXAS GEOLOGICAL SOCIETY, spring field trip, vicinity of El Paso, Tex., May 23-24.

NATIONAL ASSOCIATION OF PURCHASING AGENTS (oil-company buyers' group), Waldorf-Astoria Hotel, New York City, May 25-28.

June

CANADIAN GAS ASSOCIATION, thirty-fifth annual meeting, Windsor Hotel, Montreal, Que., June 4-5.

ILLINOIS-INDIANA PETROLEUM ASSOCIATION, annual conference, combined with ILLINOIS BASIN CHAPTER, AMERICAN PETROLEUM INSTITUTE, annual meeting, Robinson, Ill., June 6.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, semiannual meeting, Cleveland, Ohio, June 8-11.

AMERICAN SOCIETY OF TESTING MATERIALS, Chalfonte-Haddon Hall, Atlantic City, N. J., June 22-26.

October

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-third annual meeting, Dallas, Tex., October 8-10.

NATIONAL STRIPPER WELL ASSOCIATION, annual convention, Wichita, Kans., October 12.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, thirteenth annual convention, Wichita, Kans., October 13-15.

NATIONAL LUBRICATING GREASE INSTITUTE, tenth annual meeting, New Orleans, La., October 25-29.

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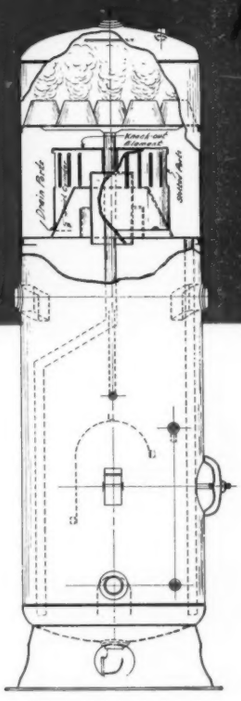
Designed for More

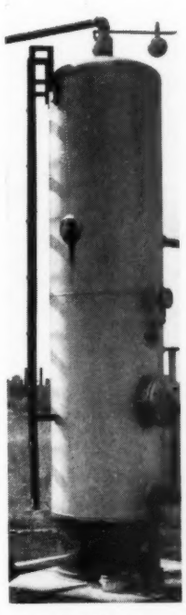
EFFICIENT

Oil and Gas Separation

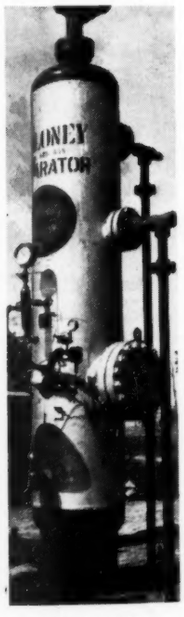


AFTER the science of oil and gas separation was well advanced,—MALONEY saw definite opportunities for improvement of the process and introduced the MALONEY Separator. This separator offers three major advances in design, the value of which has been proven during five years of field service. These new features are:

1. **SUBSTANTIALLY HIGHER VERTICAL TRAVEL FOR VAPORS IN INITIAL CHAMBER.** The oil enters the separator through inlet boxes which send it swirling downward around the inside of the shell. Extra height of the initial chamber gives the gases a higher vertical rise, thus extra time to release all heavy ends before reaching the Knock-Out Element.



MALONEY Low-Pressure Separator



MALONEY High-Pressure Separator

2. **EXTRA-THOROUGH SCRUBBING IN KNOCK-OUT ELEMENT.** The MALONEY Knock-Out Element is of improved design and has proven remarkably efficient. It consists of three concentric chambers, the inner one a turbine with large curved fins at bottom. Passing through these, the gases are given a strong cyclonic motion in the chambers of the element, in each of which oil is removed and drained to lower chambers of separator.

3. **EXTRA-EFFICIENT MIST TRAPS.** MALONEY patented Mist Traps we believe to be the most efficient yet developed. Each trap consists of a turbinated or centrifugal cap with a spiral-ribbed chimney superimposed. These traps give the vapors a final thorough scrubbing, removing any remaining particles of mist; and only dry gas leaves the separator.

Low-Pressure type is available in 125 to 150-pound pressures; High-Pressure type in 500 and 1,000-pound pressures.

MALONEY A.P.I. Bolted Steel Tanks are offered in capacities from 100 to 10,000 barrels. MALONEY Sectional Steel Stairways and Walkways, constructed in 4, 6 and 8-foot units, are adaptable for any field requirement. Tanks and Walkways may be ordered either painted or double-hot-dip galvanized.

MALONEY TANK MFG. COMPANY
38 N. PEORIA . . . TULSA, OKLA.

Warehouse Stocks at Principal Petroleum Points

MALONEY

Tanks That "HOLD THEIR BREATH"

. . . the key to Natural Gasoline Conservation

Because of an ability to "stop breathing," Hortonspheroids prevent evaporation loss from high vapor pressure natural gasolines, thereby providing a key to the conservation of these and other volatile petroleum products. This protection against vapor loss and product deterioration is more readily understood when the underlying principle of pressure storage is analyzed. Here's how it works:

A volatile liquid in storage will boil when the surface reaches the temperature at which the vapor pressure is equal to the pressure acting upon the liquid. It follows that the boiling temperature can be raised by increasing the vapor space pressure. If the container is capable of withstanding pressure, boiling will continue only until the pressure in the vapor space becomes equal to the vapor pressure of the liquid. At this point boiling will cease.

Thus, because they are built to withstand internal pressure and are equipped with relief vents which are set to open at a pressure *above* that of the maximum vapor pressures resulting from normal temperatures, Hortonspheroids are capable of preventing vapor losses from natural gasoline in standing storage.

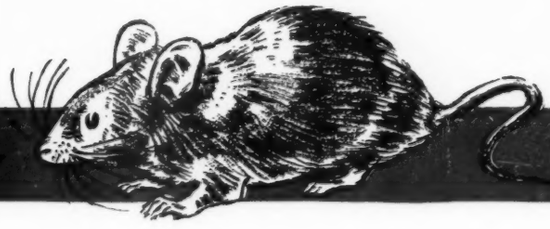
CHICAGO BRIDGE & IRON COMPANY

BIRMINGHAM • CHICAGO • CLEVELAND • DETROIT • HOUSTON • NEW YORK
PHILADELPHIA • SAN FRANCISCO • TULSA • WASHINGTON

HORTONSPHEROIDS

tough as a wildcat...

wild as a mouse

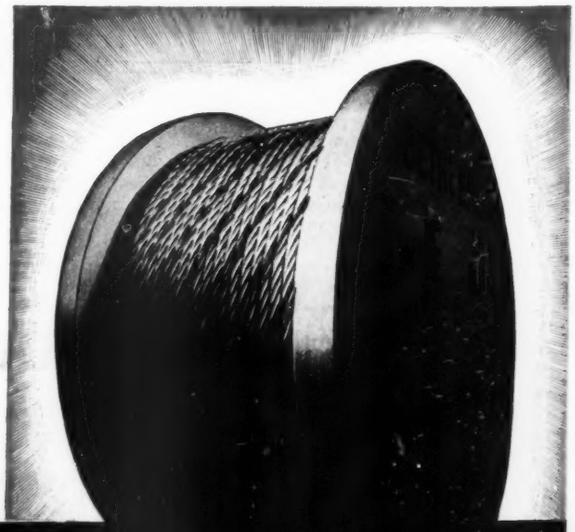


Purple Strand Form-Set is the toughest, strongest wire rope in commercial use... and yet it's not wild or hard to handle.

Reason is that the super-tough steel is preformed (Form-Set) as the rope is being made. Individual wires and strands lie relaxed, don't tend to fly outward or push inward. As a result, the rope as a whole is relaxed, spools better, stands up longer under bending fatigue.

Today wire rope is one of the sinews of war production. For efficiency—use Purple Strand Form-Set.

PURPLE STRAND *FORM-SET* WIRE ROPE

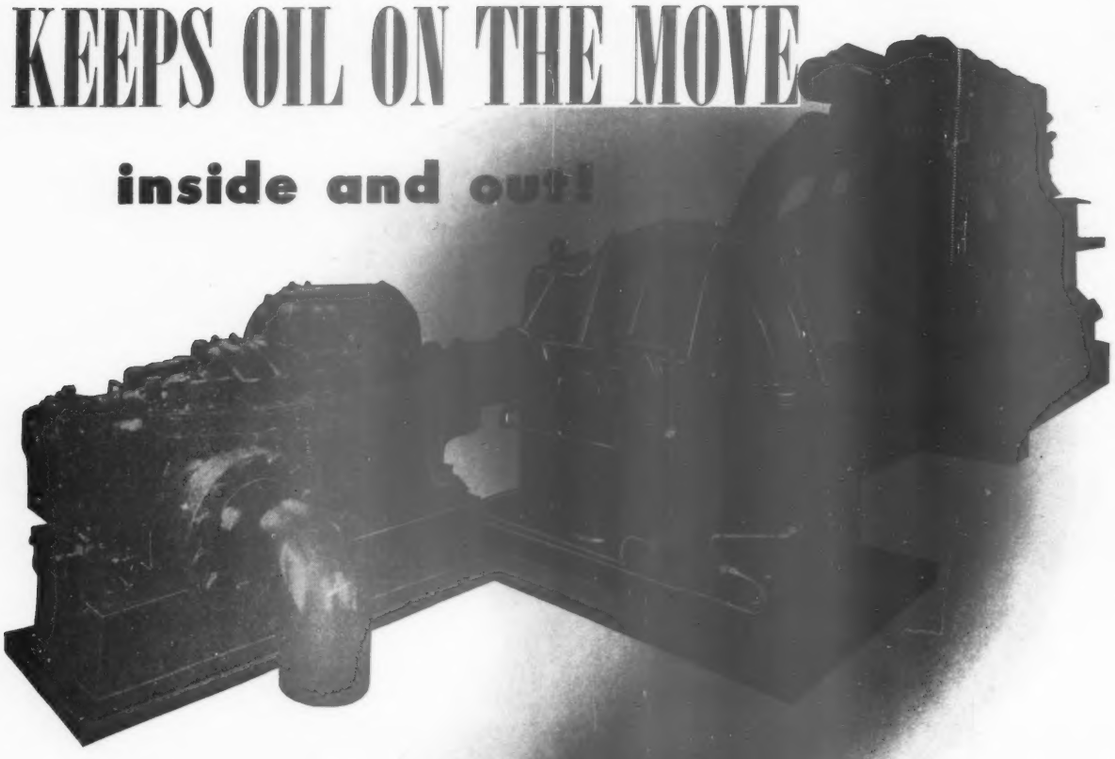


BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

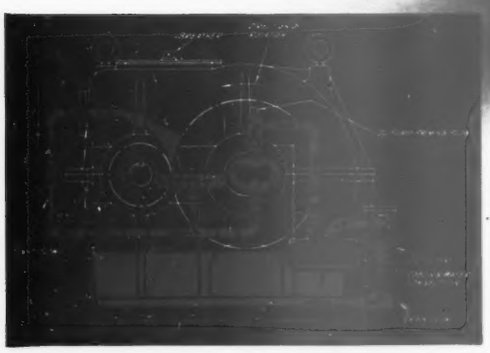
KEEPS OIL ON THE MOVE

inside and out!



Solve high-speed pump drive problems with Westinghouse pressure-lubricated

speed increasers



Side view diagram of Westinghouse Speed Increaser showing positive forced-feed lubrication system with oil pump cooler, strainer and lines, all externally mounted and easily accessible. Oil pump is always primed, ready for instant duty.

Step up engine or motor speeds efficiently . . . *dependably* . . . with geared drives that are externally pressure-lubricated for longer life and less wear.

Westinghouse Type SU Speed Increasers facilitate operation of pumps at the most economical and efficient speeds. Westinghouse Speed Increasers meet today's demands for higher pumping speeds and continuous service. The forced-feed system of lubrication—entirely external for easy maintenance—insures a constant flow of oil to every moving part. Oil is continuously strained and cooled to protect gear teeth against wear.

This uninterrupted, dependable circulation of oil *inside* Westinghouse high-speed gear units is one reason why they keep oil moving more dependably *outside* into pipe lines. Get all the facts—see your Westinghouse representative or write Westinghouse Electric & Mfg. Co., Dept. 7-N, East Pittsburgh, Pa.

J-07196

Westinghouse

WESTINGHOUSE

GEARED DRIVES

This is number 10 in a series of informative articles prepared by Macwhyte Wire Rope Company. The purpose of this series is to help wire rope users in these critical times to get the longest possible service from present ropes . . . through making useful facts on rope care more widely known.

CORROSION IN WIRE ROPE

Corrosion is one of wire rope's worst enemies. It strikes without warning. It often reaches an advanced stage before being noticed. And even though checked it still leaves its imprint of destruction.

We can better understand corrosion (and how to prevent it) by knowing what it is, what causes it, where and when it is likely to strike.

What Corrosion Is

The dictionary defines corrosion as "an action of eating or wearing away by slow degrees; a gradual decay by crumbling or surface disintegration; a gradual breaking down of the material attacked."

Two General Classes

There are two distinct types of corrosion:

Acid corrosion, and

Alkaline (or salt) corrosion.

In the case of acid corrosion the wires become pitted and stress concentrates at the reduced cross-sections where pits are located. This causes premature failure of the rope.

In the case of alkaline, or salt corrosion, the wires become encrusted with a layer of the products of corrosion. The rope becomes rust bound, for example. Alkaline corrosion increases the size and weight of the steel wires.

Acid and alkaline corrosion both may occur when ropes are operating in (or subjected to) ordinary atmosphere or weathering, or special conditions which subject the rope to either acid or alkaline substances.

What Happens When Corrosion Sets In?

When this occurs the rope loses its flexibility. Then some of the wires are overloaded, which causes them to break. This is the "beginning of the end" for the entire rope. It starts to wear away rapidly.

No Way To Determine Rope's Safety Once Corrosion Sets In

Corrosion, probably the most severe type of deterioration, is the most difficult to evaluate. Ordinarily when internal corrosion has taken place, external corrosion is also present. But it is impossible to accurately estimate by any known means the remaining strength or safety factor of the rope once corrosion has set in.

More Information

The next advertisement in this series prepared by the Macwhyte Wire Rope Company will discuss ways of preventing corrosion, or in those cases where corrosion has gotten a start how to check it from doing further damage.

Feel free to write us on this, or any problem you may have. We are ready at all times to do whatever we can to help you get the most from your wire rope.

* * *

VICTIMS OF CORROSION!

These ropes never had a chance to live a full and useful life. Left unprotected against the elements, they were attacked and needlessly destroyed by the ever present wire rope saboteur: corrosion.

A very good example of Alkaline Corrosion. Notice how outside wires are partially eaten away—a rope unfit and unsafe. Crown wires have broken up. The other side of the rope next to the sheave has few broken wires . . . but if flexed in the opposite direction they would also break.

This rope was exposed to acid fumes which caused the wires to become brittle. This reduced their fatigue resistance and resulted in the wires breaking while bending over sheaves.

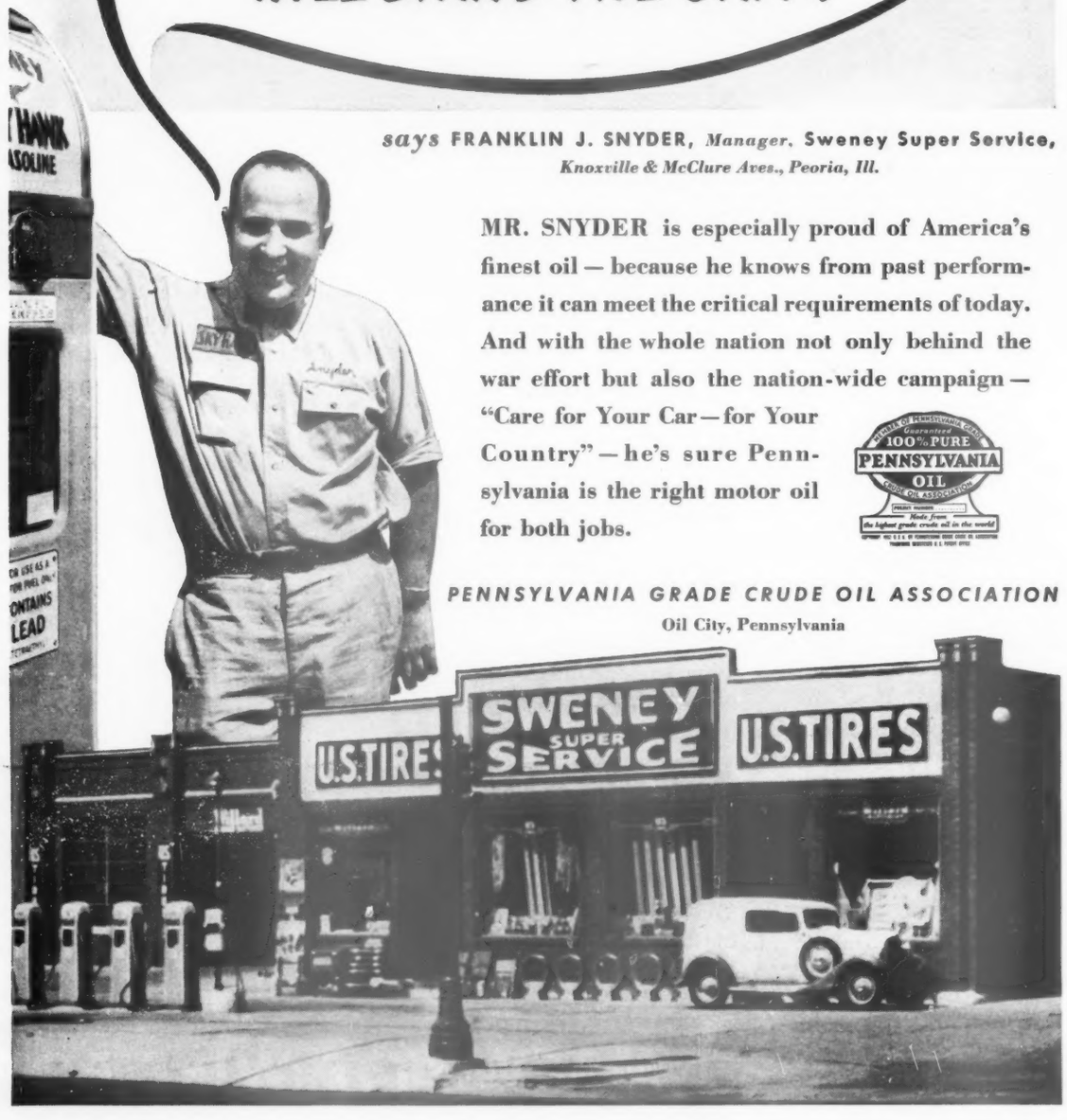
Macwhyte Company Manufactures:
MACWHYTE PREformed and Internally Lubricated Wire Rope
Monarch WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Cable
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie Rods

NO. 618-C

MACWHYTE WIRE ROPE
Made by MACWHYTE COMPANY, Kenosha, Wis.
NEW YORK · PITTSBURGH · CHICAGO · FT. WORTH
PORTLAND · SEATTLE · SAN FRANCISCO
DISTRIBUTORS THROUGHOUT THE U. S. A.

"EVERY QUART OF PENNSYLVANIA OIL I POUR IN A CRANKCASE MAKES ME FEEL SURER AMERICA'S CARS AND TRUCKS WILL STAND THE GAFF!"

says **FRANKLIN J. SNYDER,** *Manager,* **Sweney Super Service,**
Knoxville & McClure Aves., Peoria, Ill.



MR. SNYDER is especially proud of America's finest oil — because he knows from past performance it can meet the critical requirements of today. And with the whole nation not only behind the war effort but also the nation-wide campaign — "Care for Your Car — for Your Country" — he's sure Pennsylvania is the right motor oil for both jobs.

Guaranteed 100% PURE PENNSYLVANIA OIL

PENNSYLVANIA GRADE CRUDE OIL ASSOCIATION
Oil City, Pennsylvania

The "Oil-Man's Motor" Gave Me More Dependable, Trouble-Free Production on Every Barrel . . . And Cut My Costs!

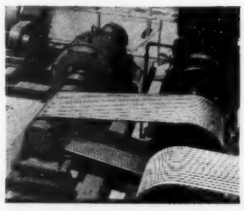
"I wanted a motor that wouldn't let me down! I had to have husky equipment that could produce under all conditions—take a lot of punishment—and keep costs low. My production is better, and my costs are lower since I started using Allis-Chalmers Lo-Maintenance Motors."

Take a tip from top-notch oil men! There's no "down-time" loss when you use Allis-Chalmers Lo-Maintenance Motors. For low cost, uninterrupted production—for performance that's more than just a rated horsepower . . . the records show that Allis-Chalmers full-measure construction leads the field!

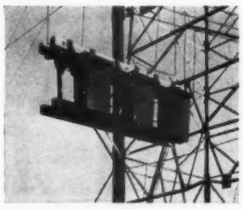
Quality to the core is the mark of the Lo-Maintenance Motor. There's no stint or skimp in materials or workmanship. *Twistless, distortionless stator* is specially treated with all-over, insulating varnish for full resistance to deterioration, moisture and mild acids. *Indestructible, silver-brazed rotor* provides extra motor life. *High carbon steel frame* assures rigid bearing alignment . . . adds protection and strength.

See how the Lo-Maintenance Motor can cut your costs—up your production—and improve your profits. Contact your supply company. Or write direct to Allis-Chalmers, Milwaukee, Wisconsin. A1444

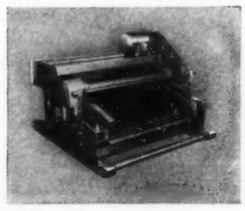
SAVE MONEY WITH ALLIS-CHALMERS OIL-FIELD EQUIPMENT



TEXROPE SUPER-7 V-BELTS: The newest and best in power transmission. Matched sets of belts that pull together . . . anti-stretch cords that wear longer . . . cool-running rubber that lowers heat, lengthens life.



ELECTRICAL EQUIPMENT: Complete line of distribution transformers (shown above)—switchgear and control equipment delivers full-measure performance . . . cuts your operating costs on every job.



MUD SCREENS: Allis-Chalmers "44" Shale Shaker saves time, speeds production with more efficient screen design. Complete unit, ready to work. Rubber mounted body. Write for Leaflet 2313.

ALLIS-CHALMERS · MILWAUKEE · WIS.

We are making a real all-out effort

From Field to Market

MAIN LINE

BOOSTER

DISTRIBUTION

POWER GENERATION

HORIZONTAL DOUBLE-ACTING GAS ENGINE-COMPRESSORS
for heavy duty main line service, in the larger capacities

ANGLE GAS ENGINE-COMPRESSORS
for main line, booster and distribution service, in medium capacities

VERTICAL CONVERTIBLE GAS-DIESEL ENGINES
for auxiliary station power service

UNIBLOC GAS ENGINE-COMPRESSORS
for limited space, for gas distribution service

OPPOSED TYPE MOTOR-DRIVEN GAS BOOSTER COMPRESSORS
design gives minimum shaking forces, for bad soil conditions

DUPLEX SYNCHRONOUS MOTOR-DRIVEN COMPRESSORS
for gas distribution service

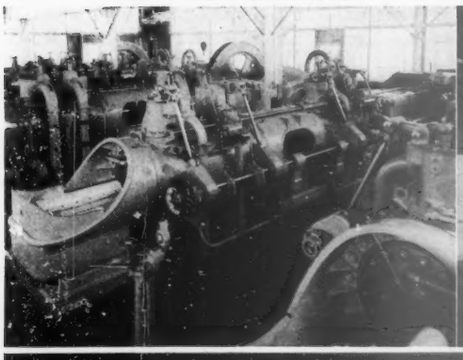
M12-14

IT is hardly necessary for us to tell our customers that it is becoming increasingly difficult to fill their orders as promptly as we should wish. The effects of the complex influences at work in the war production program are now well understood. Our products and the materials from which they are manufactured are on the critical lists, and are subject to priority control with its unavoidable delays and disappointments.

You can be assured however that our entire organization is making a supreme effort to meet the difficulties as they arise, exerting every facility to meet your needs. We want to emphasize the point that your orders today are as carefully handled as they were during those days of recent memory when our big problem was not how to meet the demand but how to keep our men employed and best occupy plant facilities.

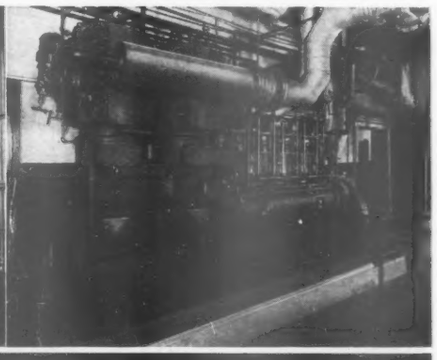
WORTHINGTON PUMP AND MACHINERY CORPORATION
General Offices: HARRISON, NEW JERSEY
Offices and Representatives in all Principal Cities

Horizontal gas engine-compressors



An angle gas engine-compressor unit

Unibloc gas engine with compressor



WORTHINGTON

This Hunt coring unit, shown in a Deep South Louisiana field, employs Link-Belt Shafer P-7200-F series roller bearings on drum shaft and jack shaft.

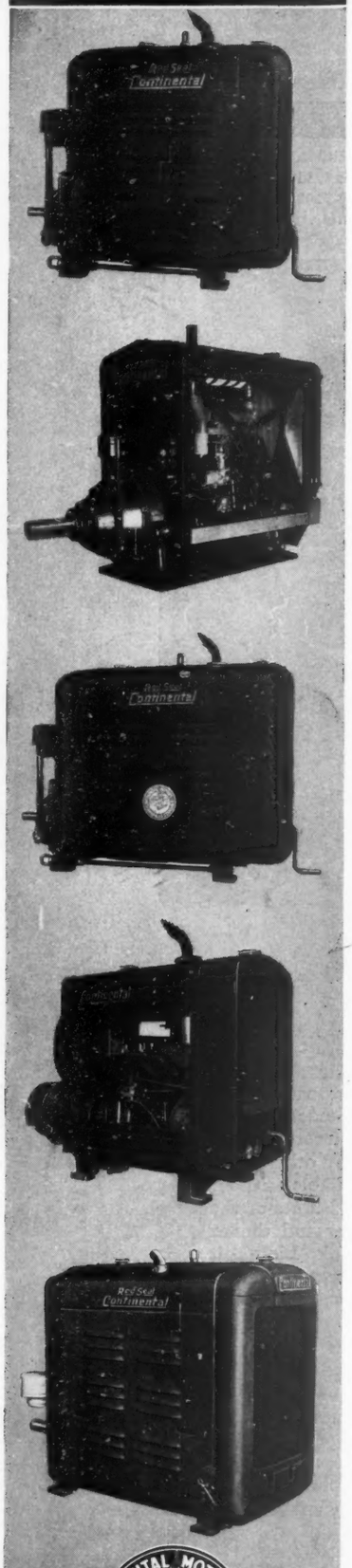
KNOCKS *Friction* RIGHT OFF THE DERRICK FLOOR!

The chief advantage of recovering cores by wire line is time savings. Valuable geological data now ride from 2 miles depth to surface in a hurry . . . hoisted via wire line reel. With Hunt Tool Co.'s steam engine driven coring reel pictured here, the trip out is a remarkably smooth one . . . for the reeling mechanism rides on Link-Belt Shafer Roller Bearings. These true fighters of machinery's greatest foe . . . friction . . . safely and efficiently cushion radial and thrust loads on the drum shaft and jack shaft of this modern unit. They are inherently suited for the speed and rough going this type of work demands . . . self-aligning . . . free rolling action . . . dust proof . . . the ability to carry radial or thrust loads or any combination of both. Yes, they knock friction for a loop in the oil fields, whether on coring units, drilling rigs, lighting units or many other types of oil industry equipment. Available without mountings or as pillow blocks and units of the flanged, take-up, cartridge, hanger and duplex types. Send for No. 1775 Data Book. Link-Belt Company, Indianapolis, Dallas, Houston, Kansas City, Mo., Los Angeles, New York, Toronto. Distributors in all fields.

8827-A

LINK-BELT
FRICTION FIGHTER
BEARINGS
Roller and Ball Types

Continental Red Seal Engines
from 5 to 150 H.P.



Pressure Lubricated Barrel-Type Tappets!

These Red Seal Continental heavy duty barrel-type tappets have larger bearing area. Adjustment is simple and the lock effective.

Other important features in Red Seal Continental Engines for oil field service are — directional cooling — full length water jacket — interchangeable bearings — counter-weighted crankshaft with precise balancing — internally sealed water pump — and individual porting for quick starting, maximum power, economy, and flexibility.

Sales and Service Facilities

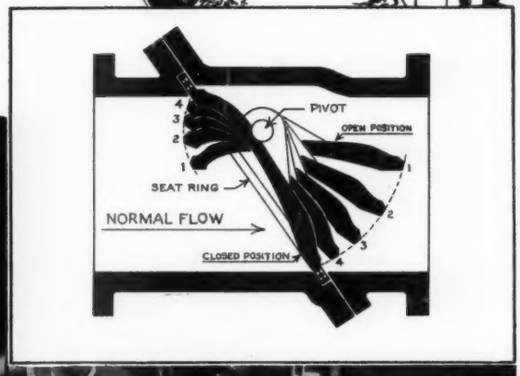
Dallas: National Welding & Grinding Co.
Houston: C. Jim Stewart & Stevenson Co.
Longview: Standard Tool & Mahcine Co.
Wichita Falls: Wichtex Machinery Co.

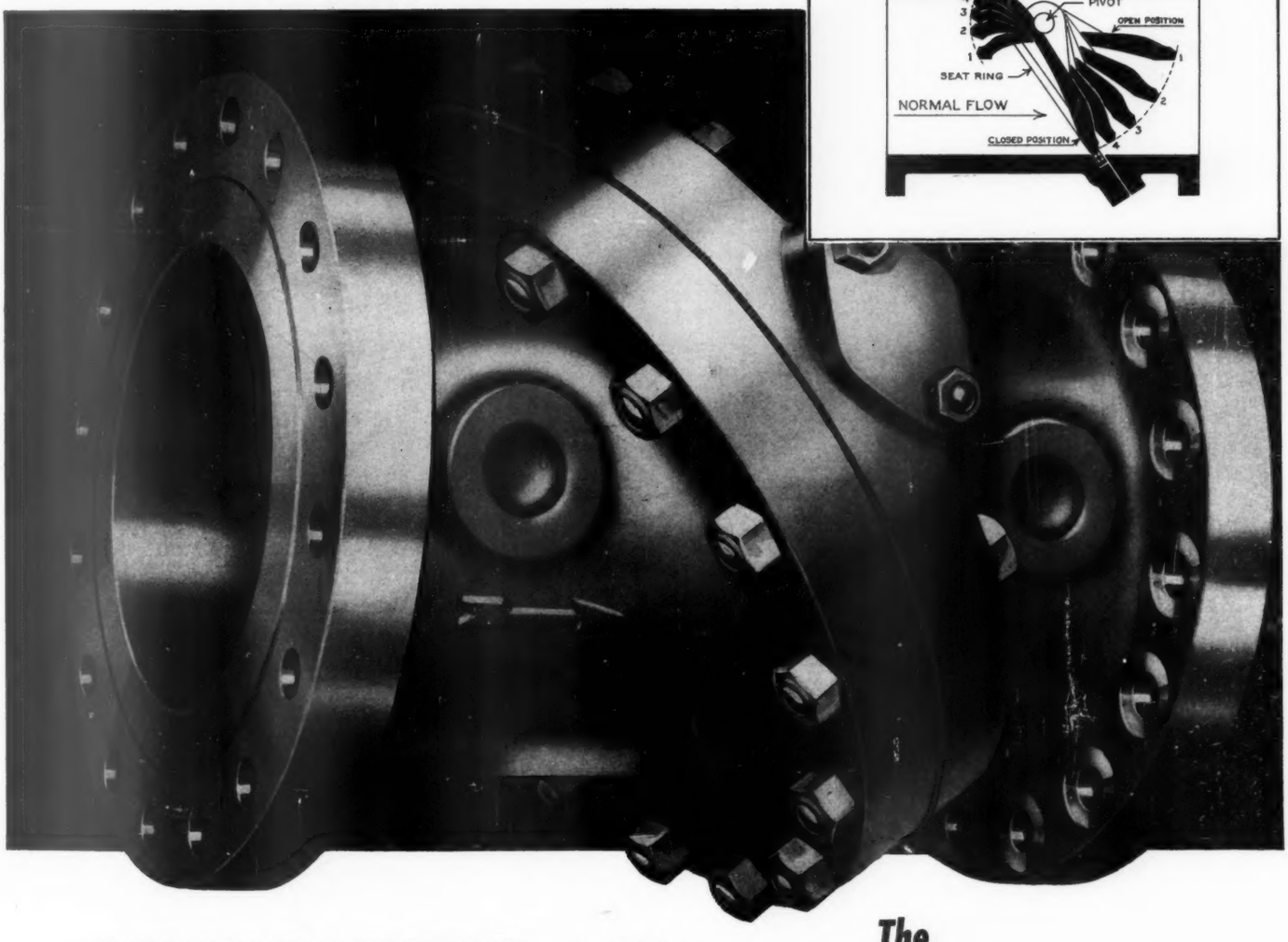
CONTINENTAL MOTORS · Powerful as the Nation · AMERICA'S STANDARD

Continental Motors Corporation
MUSKEGON, MICHIGAN

This Disc Can't Be Thrown Out of Order

...because IT NEVER SLAMS





CHAPMAN NON-SLAM CHECK VALVES are protected against wear by the tilting disc . . . of airfoil design . . . which rides steadily in the flow when the valve is open. And when flow slows, this disc is cushioned silently to a drop-tight seat. So it can't slam . . . can't set up surging or hammering in the line . . . can't open up the pipe joints. Head losses are cut as much as 80%.

Chapman Non-Slam Check Valves increase operating efficiency in refineries and on natural gas lines. They are made in iron and steel for pressures from 150 to 1500 lb. . . . with any type of end-connections . . . in a wide range of steels. Write for bulletin.

The

CHAPMAN

VALVE MANUFACTURING CO.

Indian Orchard, Mass.

Pure Oil Steps Up Kaltenborn Radio Program

Increases Radio Schedule to 5 times a week, Mondays through Fridays, over 37 NBC Stations

Starting May 11, H. V. Kaltenborn begins his fourth year of broadcasting for Pure Oil—with a program nearly doubled in frequency and effectiveness.

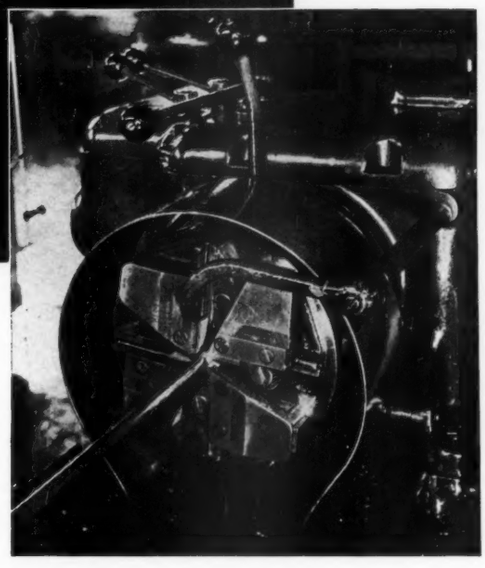
America's No. 1 news analyst—who is also America's No. 1 oil salesman—now gives two additional days of radio support to Pure Oil jobbers and dealers at a time when they need it most.

This increase in Pure Oil's advertising dramatically demonstrates the company's confidence in its jobber and dealer organization. If you would like to "Be sure with Pure", get in touch with the Pure Oil office nearest you.

H. V. Kaltenborn is now at his peak of popularity among radio listeners—the top news broadcaster on the air. Tune in and find out why. NBC stations, Mondays, Tuesdays, Wednesdays, Thursdays, Fridays—7:45 P.M. EWT, 6:45 P.M. CWT.

THE PURE OIL PURE COMPANY, U.S.A.

Be *sure* with Pure



The precisely built

LANDMACO

— assures increased profits

A west coast manufacturer of Oil Field Equipment uses the LANDMACO Threading Machine for cutting continuous thread studs from 4140 annealed, alloy steel of 291 Brinell • • •

• • • The studs are threaded in 12′ bar lengths. The threads—3/4″ diameter, 10 pitch N.C.—have a permissible tolerance of .0025″ on pitch diameter.

By using the LANDMACO, operating cost is reduced 20%—the number of bars threaded, per grind of the chasers, increased 30% over previous methods.

These improved performance standards assure increased profits.

Investigate the advantages of using the LANDMACO Threading Machine for your Threading Operations.

LANDIS MACHINE COMPANY, Waynesboro, Penna., U. S. A.

REPRESENTED IN THE DOMESTIC OIL FIELDS BY:

Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston Texas; Murray, Baker, Frederic, Inc., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

THE MOTORIG, developed by the Shell Oil Co. Inc., and built by the Unit Rig and Equipment Company of Tulsa, is one of the most unique and probably the largest self-propelled drilling rig in the world. It is mounted on an FWD chassis equipped with special three-axle drive running gear and its power transmission system. The power is taken from the drill rig compound to propel the truck, which requires no motor. Drilling and driving power are both supplied by three 150 hp. Cummins Diesel engines. The road speed of this unit is 25 miles per hour and it is built within all highway requirements.

Here is another instance of the successful development of a highly mobile drilling rig in which the FWD four-wheel-drive principle and power transmission system played a vitally important role. It's the outstanding dependability of FWD four and six-wheel drive — the extraordinary capacity to get through to location with the heaviest equipment—that makes FWD preferred by oil field men everywhere. FWD trucks provide the unfailing hauling power that brings men and gear to location over terrain impassable to ordinary trucks.

Available in a complete line of four and six-wheel drive trucks, gasoline or diesel powered, for every servicing, drilling, or hauling requirement.

Write for literature.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis.
Canadian Factory: KITCHENER, ONTARIO

FWD POWER PROPORTIONING DIFFERENTIAL
In the FWD six-wheel-drive truck the engine's power is distributed to each axle in direct proportion to its loaded weight — 1/3 of the power to the front axle and 4/5 of the power to the rear bogie — accomplished by a free running torque proportioning center differential, an exclusive FWD feature assuring full-powered traction on all six wheels.

FWD
4 AND 6 WHEEL DRIVE TRUCKS

When Little Things Loom Big··· by Alexander

PACKING RINGS, TOO, are one of those "tremendous trifles" that influence people. Mrs. O'Reilly, for instance, doesn't know a packing ring from a gas holder but there'll be the devil to pay if the gas pressure plays tricks with her pot of potatoes. And if the jack hammer Mr. O'Reilly wields every day suddenly stops breathing, heaven help the sinning compressor. No engine or compressor manufacturer, no user can afford the consequences of improperly specified, poorly designed or carelessly made packings—especially since the cost of good France packing is a drop in the bucket compared with the cost of delays, breakdowns, scored rods or cylinders.

France makes regular packings for usual conditions but is better known for its cooperation with industries in the development of special packings. From this cooperation have come packings for safely handling synthetic, poisonous and inflammable gases—for vacuums or pressures up to 15,000 lbs.

If you have a regular or a new job for packing, let France help you.

PACKINGRAM

by

E. A. FRANCE

CARBON-BAKELITE

Packing and Piston Rings

Carbon-Bakelite Packing and Piston Rings give outstanding service in natural gas compressors. They have proved equally satisfactory in compressors for many other gases, notably propane, butane, methane, still gas and others of the hydro-carbon series. They are chemically immune to the effects of "sour" gas.

Carbon-Bakelite is a phenol-formaldehyde product containing a high percentage of fine carbon particles, laminated with duck and bonded under heat and tremendous pressure. It is a hard, dense, durable, non-metallic substance, light in weight, resistant to corrosion. Carbon-Bakelite possesses a very low coefficient of friction and strongly resists wear. The carbon content greatly improves the wearing and bearing qualities of the Bakelite.

Carbon-Bakelite, used for packing or piston rings, produces a high polish on the rod or cylinder. Rings made of it will out-wear metal rings in gas service. They wear especially well on sprayed-metal rods. The ring retaining grooves show no appreciable sign of wear. This is due to the fact that the rings, being much lighter than metal, cause no hammering effect on the groove walls when the stroke is reversed.

The France Manufacturing Company furnishes Carbon-Bakelite packing rings in cases of their own manufacture to fit any compressor stuffing box, or rings will be furnished to fit any make of packing case now in service.

France Carbon-Bakelite piston rings are made with a step joint, sealed from the back by the cast iron expander, to prevent by-passing of gas. Three-piece segmental, step-joint rings are also supplied.

Specification blanks for ordering any of the products above are available promptly upon request.

Complete line of packing for all gases up to 15,000 lbs. pressure, as well as for superheated steam engines and gas engines.

FRANCE MFG. CO.

FRANCE MANUFACTURING COMPANY

Belgrade and Orthodox Streets • Philadelphia, Penna.

"Don't Take A Chance—Take FRANCE"

"We started our Diesels out right – lubricated with GULF PARVIS OIL."

Says this municipal light plant Superintendent

"And here's the operating record:
No repairs, no stuck rings, and remarkably low lubricant consumption."

Actual photo of Superintendent showing a Gulf engineer what fine results have been obtained with Gulf Parvis Oil in this municipal light plant.

"GULF Parvis Oil is making an outstanding record of performance in our plant" says this municipal light plant Superintendent. "By lubricating these Diesels right from the start with this quality oil, we have avoided repairs and stuck rings, and have secured remarkably low lubricant consumption — in fact, one-third lower than we expected in the light of our experience with other Diesel engines and other lubricants."

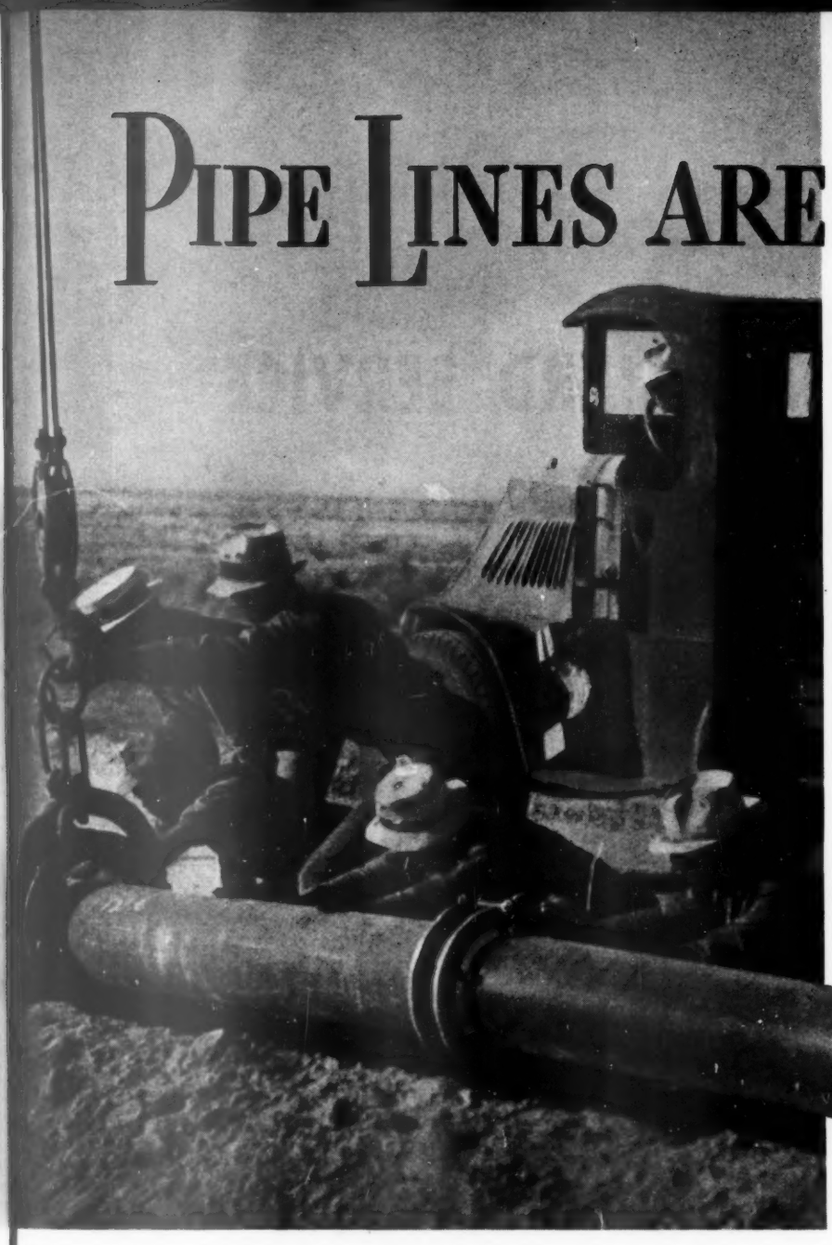
Here's one important reason why you can expect better results with Gulf Parvis Oil in your Diesels: Gulf Parvis is specially refined to withstand high temperatures, contamination with fuel and moisture, and constant churning in the presence of air. Thus it retains its high lubricating value for longer periods of time and provides better protection for cylinders, pistons, and bearings — with lower consumption in many instances.

This higher quality Diesel lubricating oil — and the more than 400 other quality lubricants in the Gulf line — are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

GULF OIL CORPORATION
GULF REFINING COMPANY

GULF INDUSTRIAL LUBRICATION

GULF BUILDING
PITTSBURGH, PA.



PIPE LINES ARE POWER LINES in *Production for Victory*

Oil, gas and gasoline—power for our armed forces, power and heat for our armament plants—are urgently needed at many points, in double-quick time. Pipe lines—made of Steel—will deliver them. But more pipe lines are needed.

While ships, planes, tanks and combat cars get first call on steel, oil and gas are needed to build them. Oil and gasoline are needed to put them into action. So, it's Republic's job to make more steel—enough for armaments *and* pipe lines. And that job is being done to the utmost of our facilities.

Republic—with an army of tens of thousands of men who know steel—is the largest manufacturer of electric weld line pipe, casing and tubing in the world—the leading producer of alloy and stainless steel, much of which goes into field and refinery equipment. Right now, Republic is setting new tonnage records—keeping its 65 plants and mines running day and night.

For we realize the vast importance of oil, gas and gasoline in *Production for Victory* and we know how vital Steel is to every branch of the Gas and Petroleum Industries.

If you want to know what makes Republic Electric Weld Line Pipe, Casing and Tubing the preferred tubular goods of leading oil and gas producers, "The Pipe of Progress," a 44-page book, will tell you and show you. Ask for it.

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

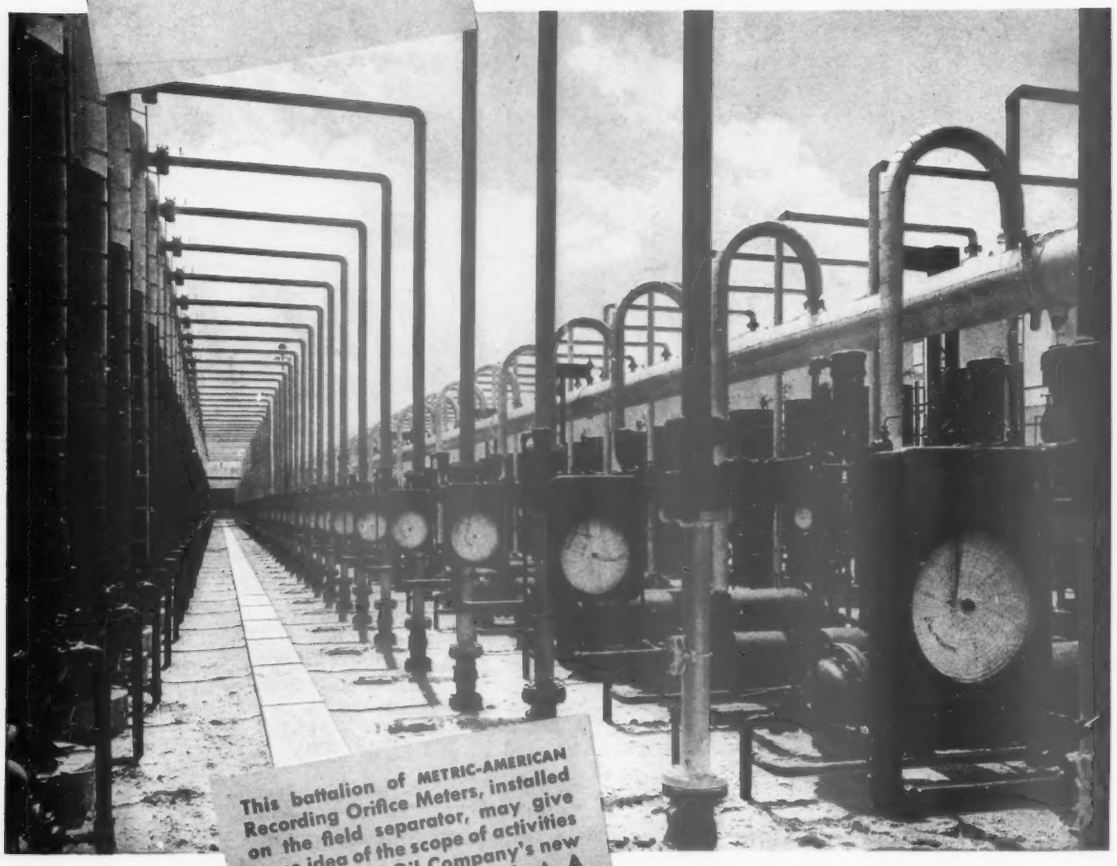
Howard Supply Company • Republic Supply Company
Los Angeles, California Houston, Texas
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company

REPUBLIC *Electric Weld*

LINE PIPE...NORMALIZED CASING AND TUBING

Other Republic products include Sheets and Plates—Upson Bolts, Studs, Nuts and Rivets—Electrunite Heat Exchanger Tubes

INDUCTED INTO HARD SERVICE



This battalion of METRIC-AMERICAN Recording Orifice Meters, installed on the field separator, may give some idea of the scope of activities at Continental Oil Company's new Ville Platte (Louisiana) plant. A 8600-horsepower giant which sets new precedents in field stabilization, natural gas recovery and pressure maintenance!

METRIC-AMERICAN has seen service in many a Continental operation. The sustained fine accuracy of the Metric-American Orifice Meter under the most trying field conditions, has called it to service in oil fields and refineries throughout the world. Ease of inspection, cleaning and field adjustment . . . the exceptionally low maintenance cost . . . are factors in its choice. Engineers and maintenance men appreciate a practical instrument that does its job dependably without pampering.

Available upon your request: Helpful and complete technical literature on orific measurement and its modern applications.

METRIC METAL WORKS • ERIE, PA.

AMERICAN
METER COMPANY
INCORPORATED (ESTABLISHED 1836)

1518